INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

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In This Issue:

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Lowell L. Carver

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Herman Brown

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Gordon O. Wilber

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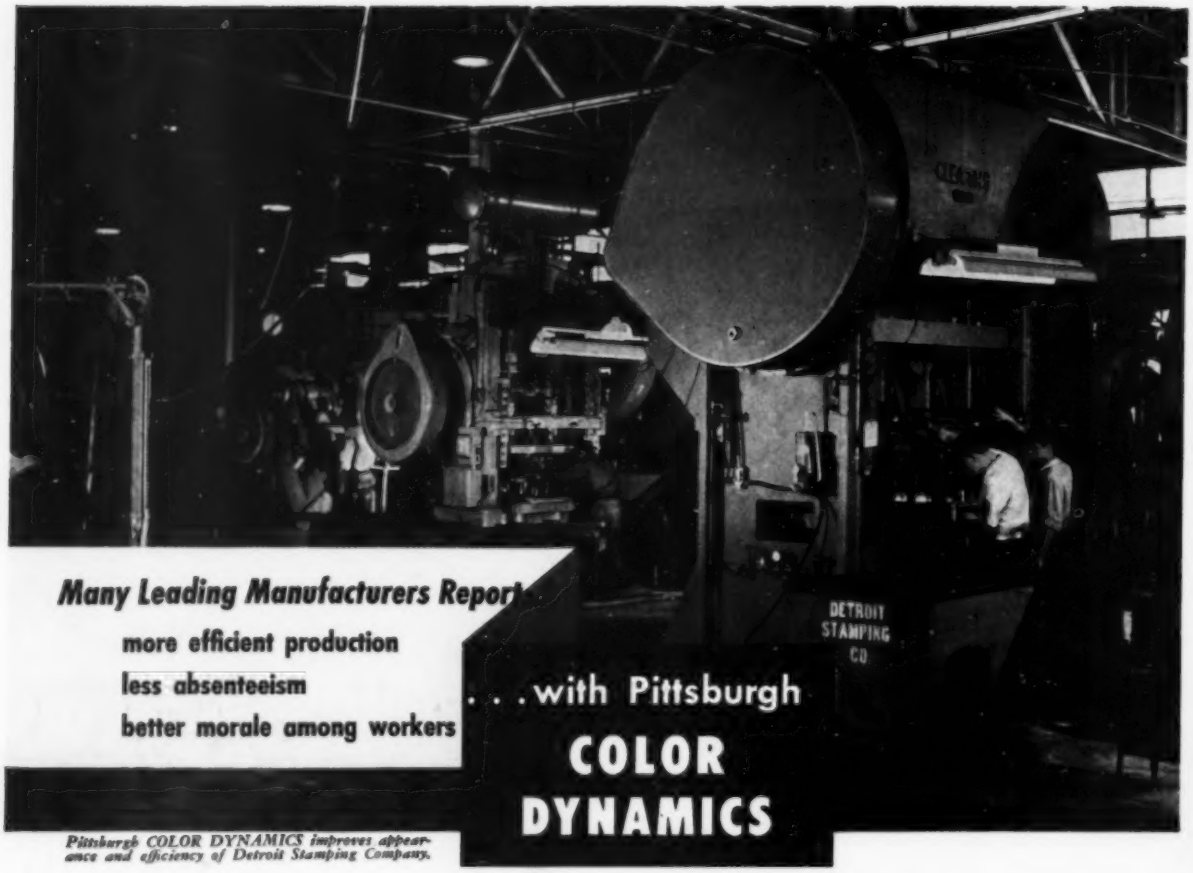

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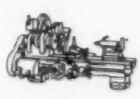
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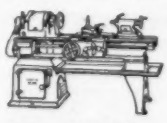
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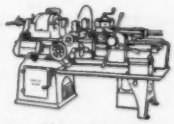
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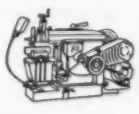
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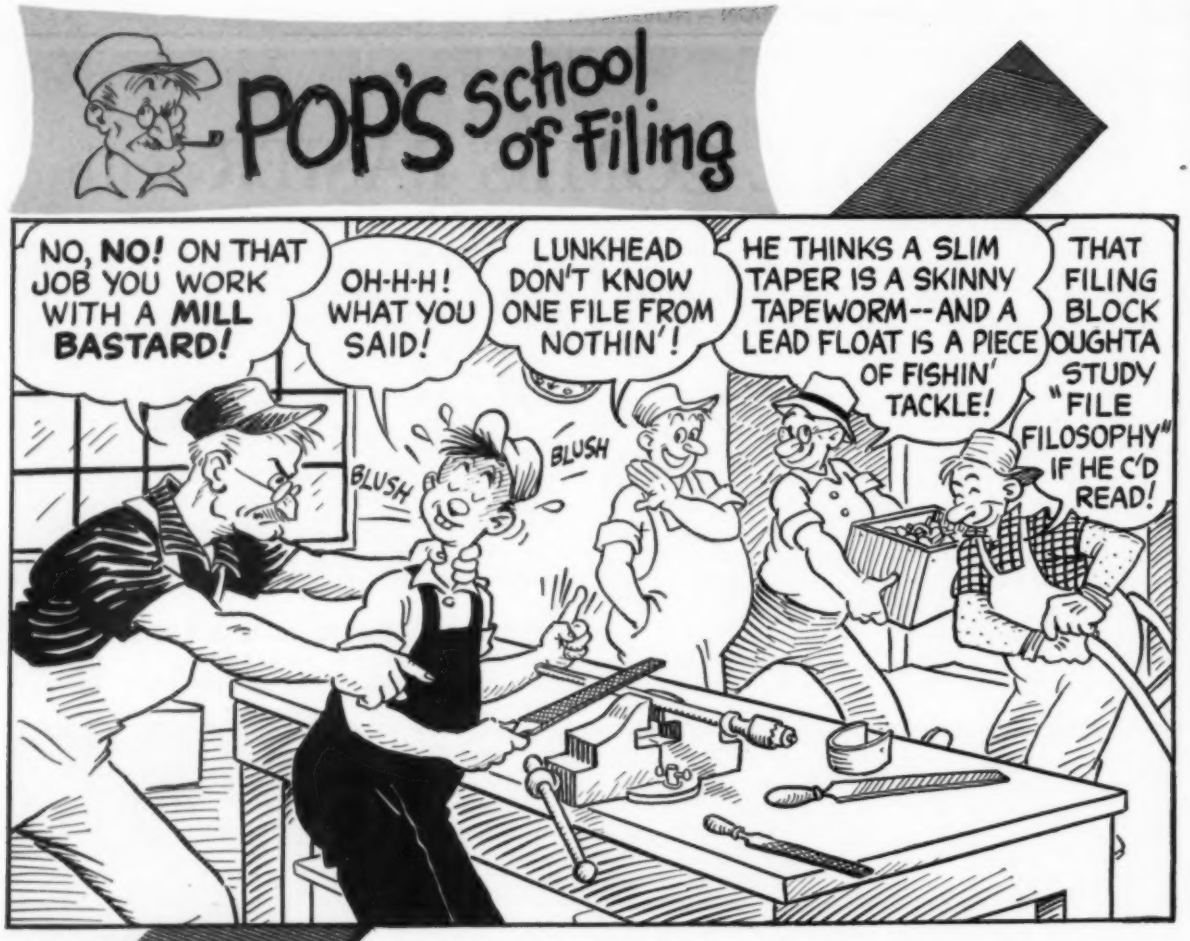
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NOVEMBER, 1950

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THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

Published on the 15th of month preceding date of issue

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Our Next Issue

The December issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will be the 1950 preconvention number. As usual that issue will carry a description of the schools of the convention city — Miami, Florida. The convention meetings have been planned to cover all phases of industrial arts and vocational education, and it will be well not to miss those that bear on your subject.

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Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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ASSOCIATION NEWS

COMING CONVENTIONS

Oct. 26. **Indiana Vocational Association,** at Indianapolis, Ind. Headquarters, Stuart Hall, Arsenal Technical School. Secretary, Glenn Barkes, 802 E. Market St., New Albany, Ind.

Nov. 2–3. **Minnesota Vocational Association,** at St. Paul, Minn. Headquarters, St. Paul Hotel. Secretary, Henry Howe, South St. Paul High School, S. St. Paul, Minn.

Nov. 2–3. **Minnesota Industrial Arts Association,** at St. Paul, in conjunction with the Minnesota Vocational Association. Secretary, Floyd B. Huffman, Redwalls Falls, Minn.

Nov. 2–3. **Wisconsin Industrial Arts Association,** at Milwaukee, Wis. Headquarters, Auditorium. Secretary, Harland J. Shufelt, City Hall, Racine, Wis.

Nov. 2–4. **Iowa Industrial Education Association,** at Des Moines, Iowa. Headquarters, Hotel Savery. Secretary, Harold Rasmussen, East High School, Des Moines, Iowa.

Nov. 3. **Maryland Vocational Association,** at Baltimore, Md. Headquarters, Lord Baltimore Hotel. Secretary, Kenneth C. Horvath, School No. 297, Baltimore, Md.

Nov. 3–4. **New England Industrial Arts Teachers Association,** at Springfield, Mass. Headquarters, Springfield Trade High School. Secretary, Arthur L. Martin, State Teachers College, Gorham, Me.

Nov. 12–13. **Oklahoma Industrial Education Association,** at Oklahoma City, Okla. Headquarters, Municipal Auditorium. Secretary, L. V. Ballard, Oklahoma City Schools.

Nov. 14–16. **Association of Land Grant Colleges and Universities,** at Washington, D. C. Headquarters, Hotel Statler. Secretary, Russell I. Thackray, 1406 C Street, N.W., Washington, D. C.

Nov. 26. **National Council of Local Administrators of Vocational Education and Practical Arts,** at Miami, Fla. Headquarters, McAllister Hotel. Secretary, Dr. Albert E. Jochen, director, Middlesex County Vocational and Technical High Schools, Easton Ave., New Brunswick, N. J.

Nov. 27–28. **National Association of State Directors for Vocational Education,** at Miami, Fla. Headquarters, McAllister Hotel. Secretary, W. E. Lowry, State Department of Education, Austin, Tex.

Nov. 27–Dec. 2. **American Vocational Association,** at Miami, Fla. Headquarters, several hotels. Secretary, L. H. Dennis, 1010 Vermont Ave., Washington, D. C.

Nov. 27–Dec. 2. **National Association of Industrial Teacher Trainers** in conjunction with A.V.A. Secretary, Willard M. Bateson, 4002 School of Education, University of Michigan, Ann Arbor, Mich.

INDUSTRIAL EDUCATORS' SUPERVISORY CONFERENCE

The Industrial Educators' Supervisory Conference met at Bradley University and Caterpillar Tractor Company, in Peoria, Thursday, June 29 through Saturday, July 1, with M. J. Ruley, supervisor of industrial arts and vocation education, Tulsa, Okla., as chairman.

After a brief orientation by the conference secretary, the opening session was given over to a consideration of apprentice programs in industry. Presentations were made by L. J. Fletcher, director of training, and by Miller Owen and C. L. Schwyhart of the training department of the Caterpillar Tractor Company, after which a visitation was made to see the training department in operation. In the afternoon session, E. M. Claude, chief of trades and industries, state department of vocational education for Illinois, gave an excellent picture of the problem of state supervision in trades and industries. The discussion period revealed that many persons present believe that councilors with responsibilities for scheduling secondary school students should include in their qualifications a minimum of three years of wage earning experience of a type which will assist them in appreciating the problems of industrial and business fields.

An evening dinner session discussion centered upon the problems of advanced graduate work and methods of bringing it into functional service for industrial education.

In the Friday morning session Thomas Diamond gave a challenging and stimulating presentation concerning the "Integration of Industrial Arts and Vocational Education" and was supported by J. H. Robohm, consultant in industrial education, Minneapolis Public Schools, who presented the "Need for an Expanded Program in Vocational Education." He proposed a platform of beliefs, specific policies and steps to be taken immediately. In the afternoon, Dr. Anthony Marinaccio, assistant superintendent of schools in Peoria, stressed the necessity of the study of the nature and needs of students as an approach for the greatest contribution of "Industrial Education to General Education."

In the evening the supervisors met with Bradley graduate students in an open forum which pointed up the need for special workshop offerings in electricity and drafting for the 1951 summer session.

The "Supervision of Industrial Education in Small Cities" was the topic for the Saturday morning session. H. J. Shufelt, supervisor of industrial arts, Racine, Wis., talked on the "Supervision of Industrial Arts." John J. Mathews, vocational director and A. L. Cunningham, co-ordinator in Gary, Ind., were leaders of the "Supervision of Vocational Industrial Education."

Among those present were L. P. Elliott, supervisor of industrial arts, Peoria, Ill.; Alvin H. Miller, co-ordinator of industrial arts, Lincoln, Neb.; D. Arthur Bricker, supervisor of industrial arts, Cincinnati, Ohio; Lee Barnett, director of industrial arts and vocational education, Moline, Ill.; J. H. Hawkins, supervisor of industrial arts and vocational education, Danville, Ill.; E. J. Simon, director, and supervisors Lowell Burkett, F. W. Swan and Jan P. Adams of the State Board for Vocational Education, Springfield, Ill.; Charles Roper of McKnight and McKnight, Publishers; L. L. Simpson and R. H. Simpson of the Chas. A. Bennett Co., Inc., publishers; Dr. William T. Bawden, State Teachers College, Pittsburg, Kan.; M. E. Franklin, chairman, dept. of industrial arts, Northeast State College, Tahlequah, Okla.; Fred Dace, associate dean, Bennett

(Continued on page 6A)

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ASSOCIATION NEWS

(Continued from page 4A)

College and several graduate students of Bradley University.

H. J. Shufelt of Racine was elected chairman of the 1951 Conference which will be held in Peoria. The Secretary was instructed to poll the field for the most favorable date for attendance.

A detailed report of the conference will again be available when the proceedings have been edited and duplicated for distribution.

Supervisors take note! When is the best time for you to attend the 1951 Conference?

Do you want a copy of the proceedings of the 1950 Conference?

Indicate your wishes to Dr. Fred Strickler, Bradley University, Peoria 5, Ill.

♦ The Wyoming Vocational Association held its annual conference at Jackson on June 6-12.

Directed by Sam Hitchcock, Wyoming state director of vocational education, and Robert J. Bishop, WVA president, the meeting was attended by vocational educators from all fields of service in Wyoming.

New officers elected were as follows: G. V. Schrodermeier, vocational director of Casper Junior College, president; and Robert P. Bledsoe, secretary-treasurer, 1950-51. Sectional presidents are as follows: J. O. Reed, agriculture; Mrs. Dorothy Somson, home economics; J. F. Parker, trade and industry; Donald Shanor, guidance; and M. E. Broyles, distributive education.

At the 25th anniversary meeting held by the Arkansas Vocational Association early this spring, the following officers were elected for the year 1950-51: president, E. L. Moseley; first vice-president, John Miller; second vice-president, J. O. Murphy; third vice-president, Mrs. Jack Searcy; fourth vice-president, Hugh Lovett; fifth vice-president, Virgil Tyler.

♦ More than 500 educators from the 48 states and all U. S. territories participated in the 1950 National Conference on Teacher Education and Professional Standards held at Indiana University, June 27-30.

The conference was sponsored by the National Education Association's National Commission on Teacher Education and Professional Standards.

Conference delegates included presidents and deans of education of many colleges and universities.

♦ The Washington Vocational Association held its annual conference on August 7, 1950, at Washington State College, Pullman, Wash.

The same week was devoted to a training session for all divisions of vocational rehabilitation in the Washington State Department of Education on the Washington State campus.

E. H. Hopkins, vice-president of Washington State College, was the main speaker at the association conference. The annual WVA banquet was held on August 8.

♦ Alpha Iota Chapter of Epsilon Pi Tau at Louisiana State University, Baton Rouge, La., held its first anniversary initiation and banquet on April 15.

Dr. DeWitt Hunt, head, School of Industrial Arts Education and Engineering Shopwork, Oklahoma A. & M. College, spoke on "The Professionalization of Industrial Arts Teaching" at the banquet. Also in attendance at the banquet were S. M. Jackson, Louisiana State Superintendent of Education, and H. O. Thomas, Louisiana state supervisor of industrial arts, who served as toastmaster for the occasion.

♦ The fall meeting of the Michigan Industrial Education Society Institute will be held at Grosse Pointe, Detroit, Mich., on October 27, 1950.

♦ The Massachusetts Vocational Association officers for 1950-51 are: Marion R. Balboni, Massachusetts State Department of Education,

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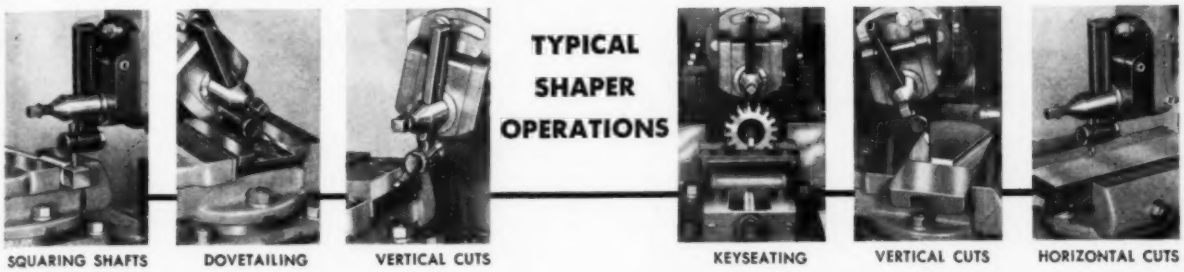

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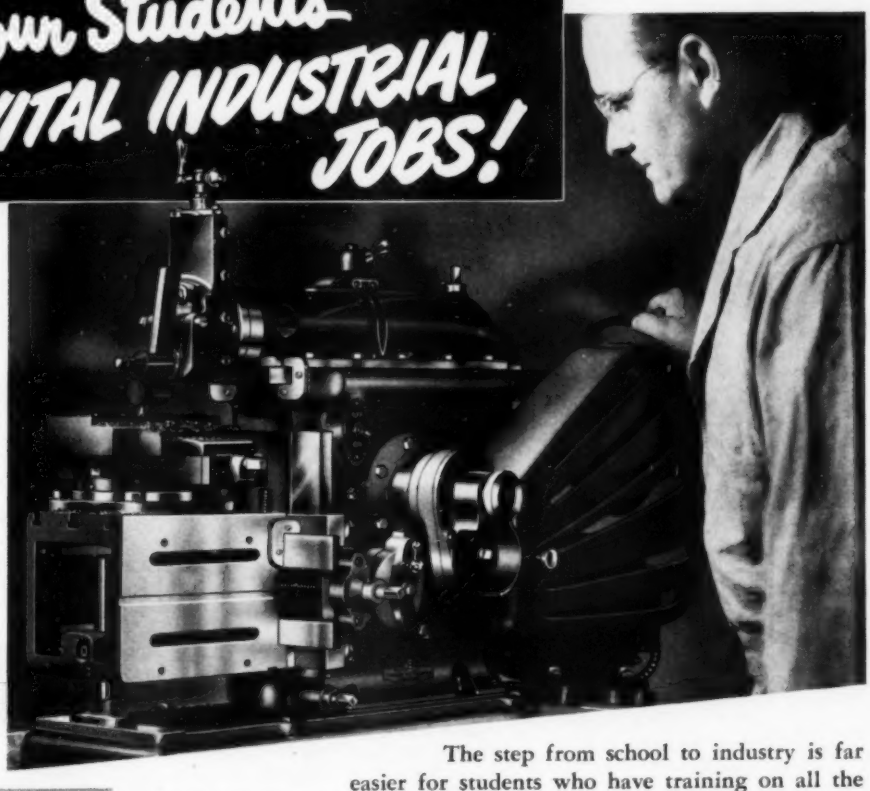

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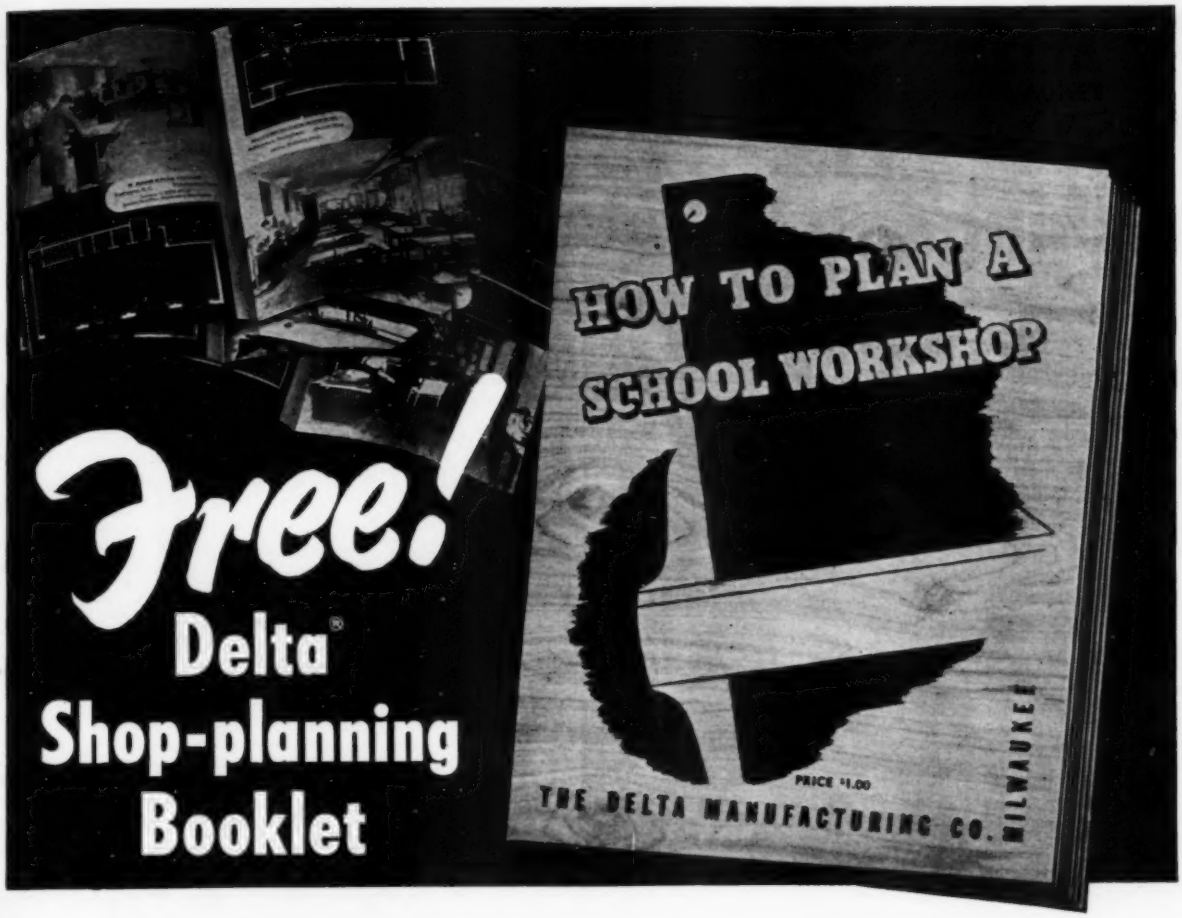

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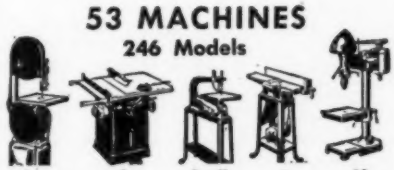

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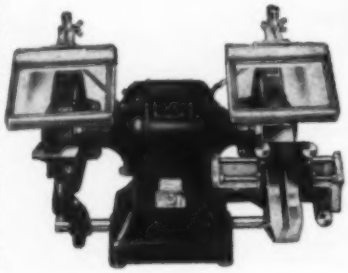

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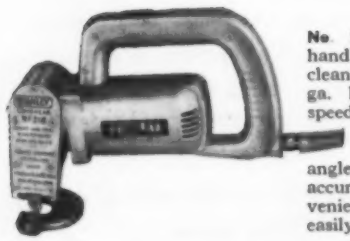

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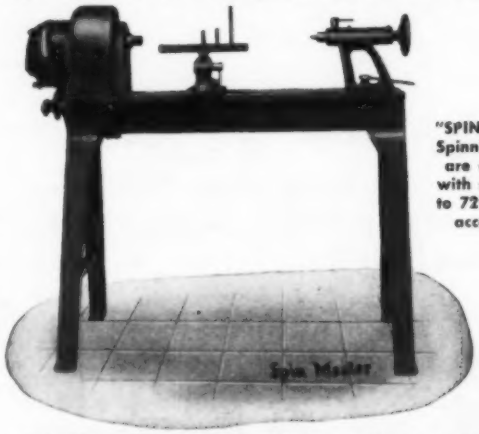

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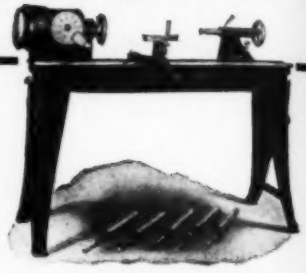

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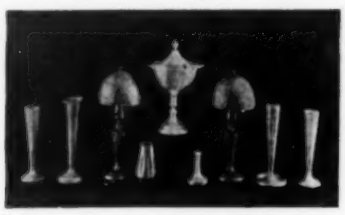

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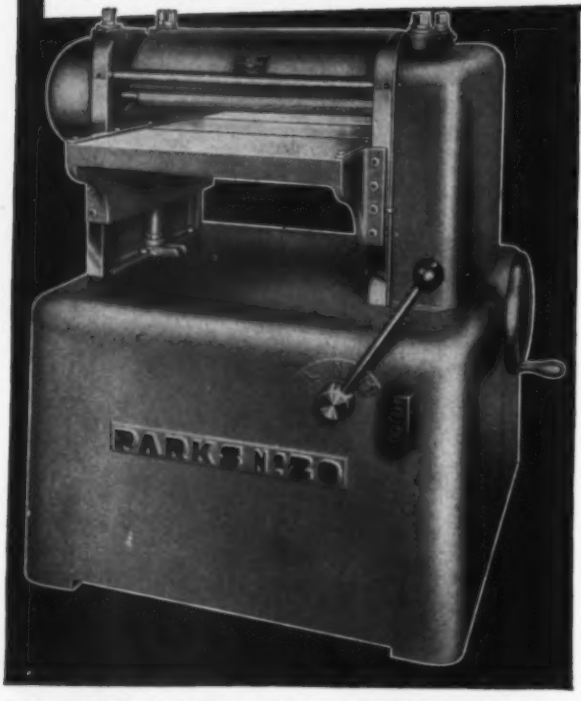

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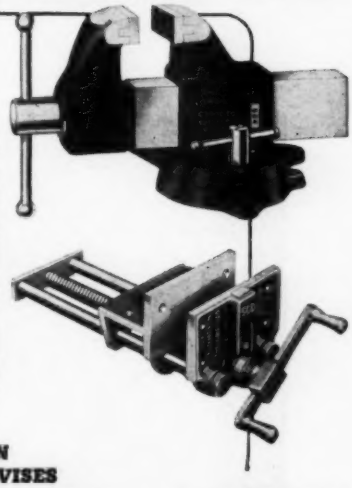

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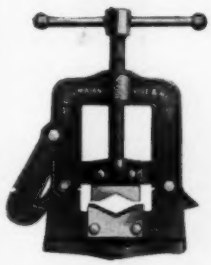

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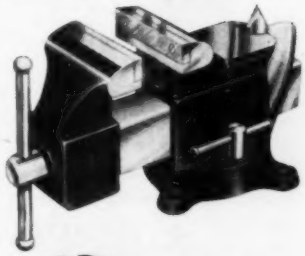

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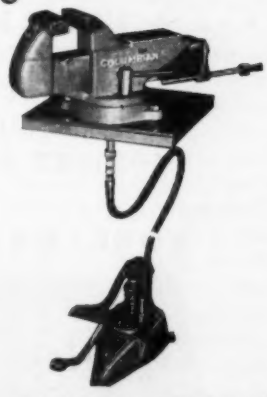

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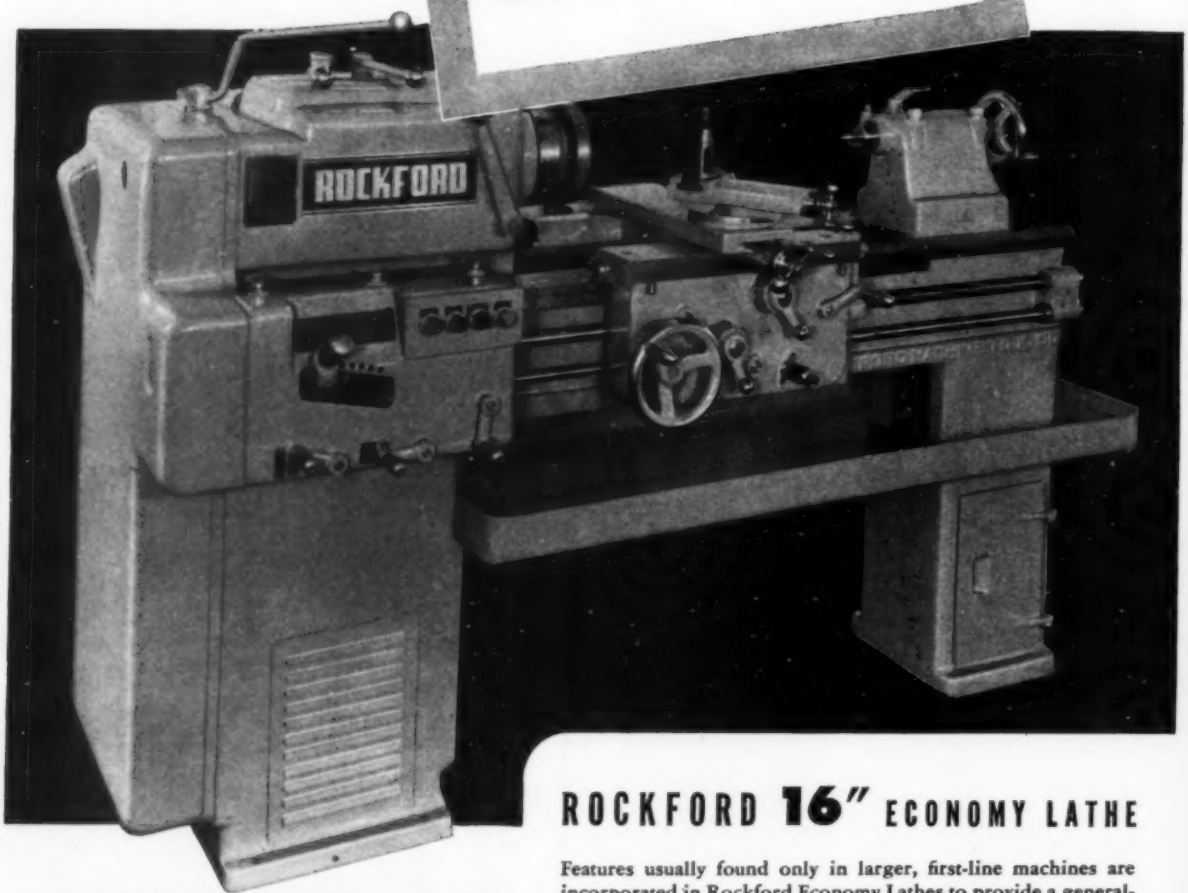

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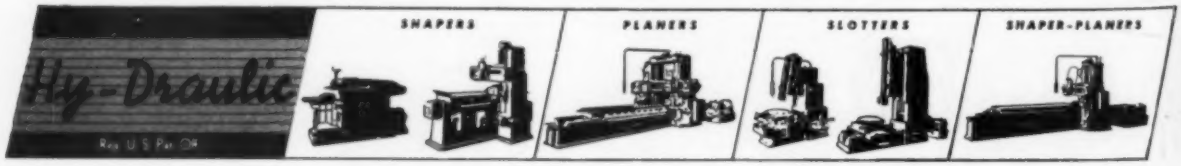

-IAVE-
NOVEMBER . . 1950

Publicizing Industrial Arts

LOWELL L. CARVER
Associate Professor of Industrial Education
Iowa State College
Ames, Iowa

Listen to your radio or read the daily papers and you will hear and see such slogans as "Good to the last drop," "Delicious and refreshing," "One of 57 varieties," "Strong as the Union," "Ask the man who owns one," and many similar ones which is proof that private business has learned that it *pays to publicize* your product or service. Many of the larger businesses spend millions of dollars annually in advertising a product. Imagine what they have spent to make these slogans famous, and they go on doing it year after year. As one writer has stated, private business has learned that the public must be wooed if it is to be wedded to a particular product or service.

Moreover, private businesses have learned that stockholders desire and demand information regarding the status of their investments. Private businesses want their stockholders to be satisfied with their investment and most of them prefer that their securities be owned by as many persons as possible. They desire these conditions because they are aware that a satisfied stockholder is likely to continue as a stockholder, a customer, and a booster for his company, whereas a disgruntled or a skeptical stockholder is likely to dispose of his holdings and become a *knocker*.

The need for publicity or, as it possibly should be called, a public relations program is as great in our schools, particularly in industrial arts, as it is in the administration of private business. Schools were established by the people, they are financed by the people, and they belong to the people. The people are, therefore, entitled to regular and truthful information concerning them. All the people are stockholders in the school enterprise and they have the same right to be kept informed concerning their investment as have stockholders in private business. To provide this information is an obligation of the school and its employees. Familiarity with the school is not as likely to "breed contempt" as is the lack of a thorough knowledge of that institution.

To organize and operate an effective publicity program for industrial arts, it is essential that those responsible understand what the program should seek to accomplish. Goals must be maintained and criteria established. It is necessary to make careful plans just as a commercial house makes plans for its advertising programs. A sane program for the purpose of letting people know the objectives, procedures, and accomplishments is legitimate activity. There is little danger that the public will be reminded too often of what the industrial-arts program is doing and how it is affecting the youth who come under its influence.

In considering this problem of publicity and its relationship to our industrial-arts program, it seems logical that we should consider some of the reasons why publicity has not been used extensively in the past. In the first place many of our teachers and administrators are unaware of the value of publicity in their department. They haven't awakened to the fact that public relations are *all important* in their work as well as in the work of the school as a whole. Then there are some who believe publicity in any deliberate form is unprofessional, yes, even undignified. They seemingly are convinced that parents should know little about the schools so they will not be tempted to meddle.

Many teachers take the position that their work is of such importance that the students will rush forward to enroll, regardless. They fail to realize that before any student enrolls, however important the work is, he must know something about it first. Then there are others who may believe in publicity, but have no feeling of responsibility with regard to it. It is always a job for the other fellow, not theirs. In many schools the shops are already overcrowded, there are already more students than they know how to take care of, consequently there is little incentive to undertake any sort of publicity scheme. They fail to recognize that a publicity program is necessary at all times. It is just as necessary during good times as bad times, it is necessary when the "goose hangs high" as when it hangs low.

Why Do We Need Publicity Now?

Industrial arts has experienced phenomenal development in the past 25 or 30 years. It is a far cry from the time when practically the only offerings were manipulative work in wood or metal, and it was called "manual training." Changes in thought and practice in general education have had a highly stimulating effect on the development of industrial arts. The war has caused increased interest in the whole field of industrial arts. One of our outstanding leaders has said, "There has never been a time in the history of industrial arts when it was more generally accepted by both educators and taxpayers as a necessary aspect of the education of all boys and girls. The same elements in the educational system which formerly opposed the introduction and expansion of industrial arts are now among its strongest advocates. As a necessary feature of the general education of all citizens of this industrial nation, industrial arts has found a secure place in the schools and in public esteem." We haven't arrived, neither is the battle won for industrial arts but considerable ground has been gained and it is a challenge to each of us to maintain our position, keep up the momentum, and move forward. A strong well-thought-out public relations or publicity program

is one of the best ways to get this job done.

Again we need publicity now as a vital part of our program, for the taxpayer is probably more concerned with the program of our department than with that of any other, for it is generally a costly type of instruction. In every school where an adequate program is in operation the investment of public funds for equipment, materials, maintenance, and salaries is high. It seems necessary then that the taxpayer be kept informed and interested concerning the purposes and outcomes of the work. Many other groups of the community are also concerned because of the opportunities afforded by the industrial-arts courses for aiding large numbers of youth who would be inadequately served otherwise.

We must also keep before our public and the pupils themselves the fact that industrial-arts experiences are basic to large areas of industrial vocations. Both our pupils and parents must see this important relationship and think more definitely of shop and drawing-room tasks as preparation for possible later training in industrial occupations.

I believe we have fallen down badly when it comes to bringing before our public, yes, even before our fellow teachers and administrators, the purposes and objectives of industrial arts. If nothing more is done in the way of publicity certainly we can acquaint them with what we are trying to do.

There is evidence pointing toward an era of broad educational expansion, of which our program will be a vital part. We must be alert and ready to show what our place is in this expansion movement and how we can make a definite contribution to the over-all broad program.

Possibly we need a wide-awake publicity program if for no other reason than to wake up and inform some of our own people. Maybe we need to do a little work in our own house to see that everything is in order.

What Can Be Done on the National Level

1. Provide material of a nature that can be used by the men out on the job. We have our bulletin, "Improving Instruction in Industrial Arts," by the Industrial-Arts Committee of the American Vocational Association. This booklet ought to receive wide distribution. It will serve not only our own teachers but others also in a way that will be helpful to industrial arts. Other similar bulletins should be made available.

2. More industrial-arts teachers, the men who actually do the teaching, should be privileged to attend national meetings. They need the inspiration, information, and guidance which comes from such meetings. Most of the men in attendance at national conventions are directors, administrators, or teacher trainers. Why not try bringing one or two of your teachers each year? The writer believes it would pay dividends. He has been told by a friend that their high school gives all the shop men time off to attend the A.V.A. Convention each year. In addition the school pays their traveling expenses.

3. Make available movie shorts, and film strips which would be available to the men in the field. The story of the industrial-arts movement, how industrial arts is related to general education, and to vocational industrial education. Other titles also might be suitable.

4. Sponsor radio programs, and prepare radio material which could be sent out and used by local stations.

5. Prepare material which could be presented to newspapers and magazines for publication.

6. Make contacts with other local, state, and national organizations, such as service clubs, P.T.A.'s, Y.M.C.A.'s, labor unions, trade associations, etc.

On the State Level

1. All industrial-arts teachers should be encouraged to take out membership in a strong state association. This association should be the mouthpiece of the teachers of the state — it is very essential that we work together as a group and present a united front: If we ourselves are divided, it doesn't present a very encouraging picture to those on the outside.

2. State meetings should be scheduled at least once a year, and all industrial-arts teachers would be privileged to attend them. At such meetings outstanding speakers should be provided who know the teachers' problems and needs. In addition there should be discussions, demonstrations, and even materials for the teacher to carry home for future study and use.

3. Provisions should be made for districting states into smaller areas so meetings could be set up in each district. In this way the men of a given district would have the opportunity of meeting periodically to discuss their common problems. This also affords an opportunity for the shop teacher to invite his administrators to attend with him.

4. The formation of a state publicity committee within the state association to handle publicity on the state level is highly recommended. Very little material related to our field seems to reach the educational journals or other papers and journals. Much of this is our own fault which could be corrected if we took up this task.

5. A state periodical, published by the state association and given wide distribution, would be of value.

6. Work for a state supervisor of industrial arts. Again, the A.V.A. committee is leading the way by making available the bulletin on state supervision.

On the Local Level

1. *Good shop teaching* — There is nothing that will publicize industrial-arts more in a community than to have on the job well qualified, interested, and enthusiastic teachers. Poor housekeeping, poor relations between teacher and pupils, and insufficient shop safety instructions can tear down almost any attempt at publicity.

2. *Make use of local newspapers and school papers* — Most newspapers realize the news value of school affairs; items about school matters do not have to be sensational to be news. It should be remembered, however, that the primary purpose of newspaper publicity, is not advertising, but it is to promote a better public understanding of the purposes and values of industrial-arts courses.

3. *Public addresses* — Many opportunities arise for shop teachers to speak before social and civic groups. We should not hesitate to tell others of our work and what its place is in the education of youth.

4. *Promote adult classes* — This provides a means of getting parents and people of the community into our shops, which if handled properly may be a wonderful publicizing device.

5. *Open house* — The shop should be open at all times to visitors. Periodically an invitation should be extended to the community to visit at a specific time.

6. Displays which will be seen by pupils and public.

7. *Organize "home workshop club"* — Assist members to set up home workshops, make plans, buy tools, and even show them how to use tools.

8. Co-operate with local organizations.

9. Enlist co-operation of parents with home projects.

10. Make movies or slides of work which can be shown to groups.

11. Take pictures of activities in department which can be posted.

12. Invite local leaders, industrialists, and tradesmen to talk to classes.

13. Publish departmental bulletin.

14. Promote contests.

As one can readily see there are many devices which can be used in a publicity program. No one can use all of them, there must be a careful selection so as to meet each local situation.

In planning a publicity program it is well to remember that education is news

today as it has never been before, and industrial arts is a vital part of that education. A long-range intelligent program of publicity and public relations is needed. It is essential that those responsible for the development of this program understand what it should seek to accomplish, what goals must be maintained, and what criteria established. Our whole program finally must stand firm for an honest, intelligent interpretation of the significant and desirable aspects of industrial arts.

Manual-Arts Therapy in a Medical Rehabilitation Program*

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Definition and Objective

Manual-arts therapy is one specific phase of the complete physical-medicine rehabilitation program which includes educational therapy, corrective therapy, occupational therapy, and physical therapy as members of a medical-rehabilitation team. The manual-arts therapy program, under medical supervision, therapeutically utilizes at the prevocational level, projects of an industrial or trade nature, into which a patient enters to explore the possibility and feasibility of continuing such activities as a post hospital vocation after further training. These purposeful activities are medically prescribed by physical-medicine specialists for the primary medical purpose of restoring patients to a state of health in the shortest possible time and to decrease readmissions through individualized attention to the practical demands of daily living.

It is important that these activities be regarded as exploratory in nature, rather than as complete preparation for vocational pursuit, although in certain cases they have served to renew interest or develop techniques in vocational pursuits. This program, therefore, assists in reduction of the period of hospitalization as the patient becomes confident of his ability to perform in a definite field of work and looks forward to further vocational training and/or employment.

Physicians have found manual-arts-therapy activities to be of practical aid in testing and developing physical and mental capacities for specific types of work and a valuable means of controlling development through progressive steps which correspond to the patient's various stages of recovery.

Conferences with the vocational adviser are held at frequent intervals and the aptitude of the patient as reflected in his progress on shop projects is discussed in order that every possible effort may be made to integrate shop instruction with the patient's vocational plans after discharge from the VA hospital. In many cases, patients will discover that the work they expected to train for after leaving the hospital is not to their liking or within their capacity. Reassignment of activity will be arranged until the proper selection has been made. The fact that a patient is making progress toward his means of future livelihood and is gaining confidence in his ability to perform in a chosen line of work is not merely rehabilitation from an economic standpoint but good therapy.

Exploring New Fields of Work

The manual-arts-therapy section of the physical-medicine-rehabilitation service makes it possible for hospitalized veterans to investigate the possibilities of a new job and to select a field of work which they wish to enter and are physically able to do. This aspect of the physical-medicine-rehabilitation service is of critical importance for hundreds of severely disabled veterans. For the majority of them, such an opportunity provides the first instance of concrete encouragement which the patient has encountered in the hospital. It permits him to make an actual start in an occupation of his choice and encourages him to overcome his physical disability in order that he may leave the hospital and enter into gainful employment. For certain types of patients it provides a reasonably accurate yardstick of the individual's physical capacity, tested under actual working conditions, with proper medical supervision to insure safety to the patient. In addition, the patients will have been trained in various vocational techniques adapted to their disabilities which will be carried from the hospital into their civilian endeavors. These adapted techniques in the long run will reduce readmissions to the hospital owing to occupational aggravation of their disabilities.

These efforts for the rehabilitation of the hundreds of disabled veterans in our hospitals have received widespread support from major American industries. Such firms as International Business Machines Corporation, Eastman Kodak, Bulova Watch Company, Bausch & Lombe, Radio Corporation of America, and the International Ladies Garment Workers Union have joined our efforts to help these men find their way into purposeful activities which lead to useful jobs. Officials of these industrial organizations are giving generously of their time, technical skills and advice, to further this effort and to encourage the disabled veteran to tackle the job of constructive living once more.

As an example of the excellent co-operation that exists between outside industry and the Veterans Administration hospitals, the garment trade course, one of the many courses offered at the Veterans Hospital in the Bronx, has stimulated remarkable enthusiasm on the part of the patients. Through contact made by our volunteer instructor in the course, the International Ladies Garment Workers Union has recently approved a four months' course including power-machine operation, cutting, pattern layout, fitting, draping, hand finishing, and commercial steam pressing.

Through the International Ladies Garment Workers Union, which has provided the manual-arts-therapy section with six new power sewing machines, two dummy models, a commercial steam pressing iron and cutting machine, it is contemplated that job placement and union cards will be made available to patients who have completed the approved course of instruction.

Since the garment-trades course has been in operation, favorable comment has been received from the medical staff of the hospital with reference to the therapeutic and prevocational value of a program of this

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type. Twenty-three patients have actively participated in this new program, the majority of whom have benefited either through employment in the garment industry, further schooling, or upgrading in their present position.

Financial Savings to the Government

The human aspects of such a program are evident; however, the economic side of this picture, as it is reflected in dollars and cents cost to the government, is important. Recently, thirty paraplegic veterans who had begun a watchmaking course while in Veterans Administration Hospitals were able to be discharged from the hospital and continue their training in the Bulova School of Watchmaking and Repair. If they had remained in our hospitals, the cost for their care for the next year alone would have been $131,000. It will cost $35,000 to complete their training at Bulova under Public Law 16. This represents an outright saving to the government of some $96,000 during the next year alone. Such savings, multiplied by the hundreds for the vast numbers of disabled now in our hospitals, can amount to tremendous economies during the coming years. We owe it to our veterans to do everything possible to restore them to useful, satisfying lives; we likewise have a responsibility to the VA to do everything possible which will eliminate the financial load now imposed upon the Federal Government.

By contributing to the earlier recovery of patients and exploring their capacities for appropriate fields of employment, manual-arts therapy can save the government considerable expense. In addition to monetary benefits, the veteran who has returned to his home and a job has benefited beyond measure physically, mentally, and socially.

"Job Family" Activities

Graphic Arts: advertising, blueprint reading, commercial art, drafting, fashion illustration, lettering and layout, photography, photo-oil-coloring, silk screen.

Mechanics: art metal, auto mechanics, electricity, garment trades, machine shop, novelty jewelry, optical lens grinding, precision casting, radio construction, radio repair, television, watch repair, etc.

I Chose Teaching

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Square pegs don't fit in round holes. We have proclaimed that for years. Whether he be doctor, lawyer, merchant, chief, or anyone of the rest, including school teachers, the misfit is somewhat of a mess and unhappy. School people have been telling students, parents, and society that maladjustments are inefficient, costly, and unnecessary. And yet, many in each generation continue to go into occupations for which they have no special liking or fitness. They will eventually give up, make another choice or drag along to an apathetic and miserable end. But they are following choices, and we all reap the rewards, good, bad, or indifferent.

Problems of Nepotism

Some men follow in the footsteps of their fathers. This is often the case in business houses where a man owns part or all of the company, or where he may have some influence in the matter of hiring. There are many cases in industry, commerce, and the professions today where the son has acceded to the position his daddy left for him. It is a common remark by successful men that they expect to turn the business over to their sons in a few years. The younger generation may still be in high school, but their elders rather predestine them to jobs for life. There have been notable cases where this has worked out successfully. And the reverse also has been true. All the way down the line to the very moderate vocations the choice is often made by the parent. He will determine the line of preparation, pay the bills for training, provide the place to work and induct the son into service. It is all prescribed. The son may stifle his objections, go along with his father and make the best of it. If this means that the boy rides along on his father's success, the future is questionable. Already in America nepotism is considered a costly procedure.

Some Misfits

Misfits become problems. That statement may be open to dispute. But a few actual cases will illustrate a general truth.

1. A young lawyer died in his forties. His parents had dictated his career for him. With filial obedience he studied law, passed the bar examination and set up an office. Possessed with an abundance of nervous energy, he built up a small practice and raised a family. But his heart was elsewhere. Natural inclination would undoubtedly have led him to become an artist, for which he had the zeal and temperament. Avocational accomplishments also seemed to point in that direction. He died from a general breakdown, evidently induced by dissatisfaction over a wrong choice.

2. A tradesman at age 35 spoke to the writer about a retraining program. He had been apprenticed in the plant where his father had been employed, had become a journeyman and had worked subsequently as a skilled mechanic. No one had tested him for aptitudes and interests. He followed his father into the shop because there was no other course left open for him. But he was unhappy. He had the basic qualifications for salesmanship and could have developed in that direction. The die was cast without his consent. There are many thousands in the same position, and they are misfits.

3. A successful undertaker began training his son to take over the business. The boy was not especially interested in it but went along with the proposition. The inevitable break came. At an age a little late to learn another vocation he drifted about and at present is a general helper or "flunky" in a store.

4. A fourth case is that of a rich man's son, the victim of an oversolicitous mother and a mild-tempered father. The boy's desires to prepare for some definite job have been stifled by indulgent parents who want him to spend his time with them at vacation spots.

All these cases are duplicated many times in every city. The results are evident. Misfits are not good workmen. There is a loss to society when people are not producing to capacity and are unhappy.

But parents are not always to blame. The caprice of the individual often brings on a poor choice of occupation. Young people sometimes take a dare, making a choice to be with a pal, or for some other equally unstable reason. A bit reckless, a bit chauvinistic, they give little heed to their fitness for the vocation or to the consequences of failure. Teachers know this is not good, parents recognize it sometimes too late, and society foots the bill. All these cases point to a lack of good choice. There is a better way to proceed.

Scientific Choosing

A new day is at hand. When writing about misfits and how they came to be, one could easily get the impression that all was wrong, with a sorry mess about us. There have been many excellent examples of successful planning and advisement, many cases where young people saw clearly and pushed ahead to achievement. Now the schools, employers, and employees are recognizing that scientific means are at hand for discovering aptitudes and interests. We can predict success with a fair degree of accuracy. At one time the phrenologist held forth with his measurements of the skull. Research over the years has exploded some of his claims. Then the physiognomist came forward with his plan for testing character by facial measurements. In more recent years the whole program of vocational guidance has come along. It has its virtues and its weaknesses. Counseling has its place when properly done. The purpose of counseling is not to command, but to lead in making a choice. Special testing is helpful in discovering aptitudes. Hard experiences, cut and dry, are sometimes long and costly. If at the conclusion of all this modern procedure people are enabled to make better choices, we ought to make more use of it.

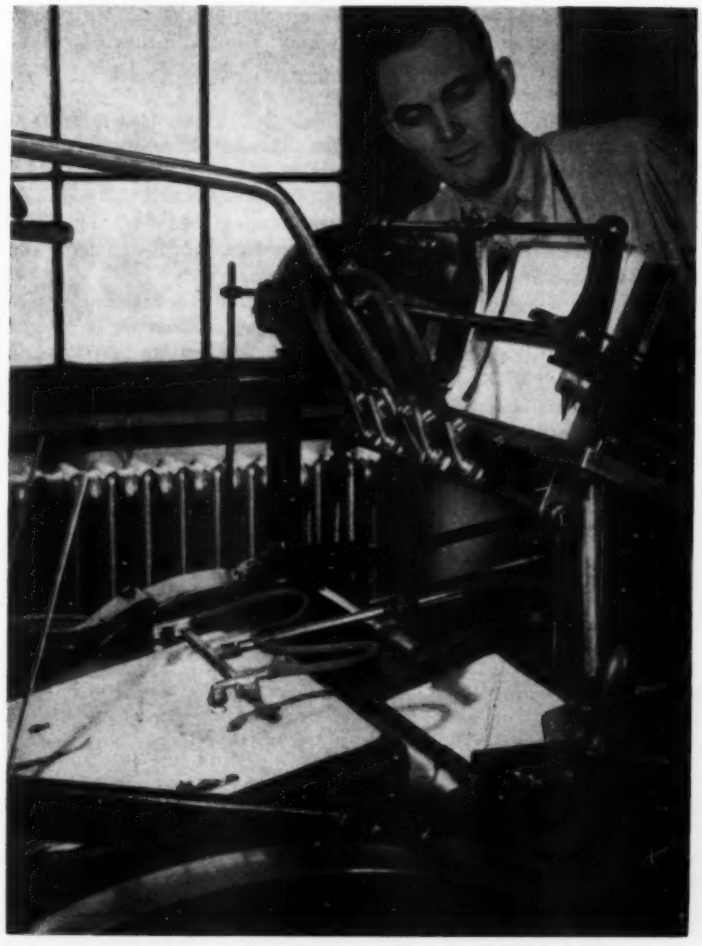
Right of Choice

Choices are prime rights. As far as possible, everyone should have freedom of determination. In the western world the field is open. The laurel wreath of victory is awarded to the man who can make the grade. There are, of course, some inherent weaknesses in a free-for-all system where the honors go to the fleet and strong, but we need not discuss them here. It is, at least, a far cry from the lock-step system of the old world where the son followed the father in his line of occupation. Valuable secrets of procedure have been lost where families in the old world died out. The artistry they had built up died with them.

Every man is the arbiter of his own fortune; so goes the saying. The old farmers used to say, "Give a horse its head and it will pull the load." It means that the individual must determine his course. He must make his choice. The other services in the community — equipment, laws, facilities, man power, can all help. But the man who would succeed must climb the hill alone. Teachers can point the way, can encourage, provide the means and inspiration, set good examples and map a clear road ahead. After that it is up to the student. Accepting these statements as facts makes it all the more important that the student be surrounded with proper facilities, information, experience, and services so that he can make an intelligent choice.

Choice of Teaching

Who chooses teaching? Do men and women of their own volition decide to enter the classroom for their occupation? Do they fall heir to it by family tradition? Do they enter on a dare, by caprice, as an opportunist, a steppingstone, or because they see in it a great field of service in which they can be happy and useful? There are teachers who fit into all these categories, the same as in other occupations. By their own admission there are some misfits in the classroom. Why they were allowed to get there or who is to blame is outside the scope of this discussion. By the same token that some are superior teachers we accept the fact that inferior quality is also to be found. In all frankness let us say that some men and women choose unwisely to enter the profession. They would have been happier and more useful in some other line of endeavor. But let us not blame them in passing. We need not review in particular the various characteristics that should be found in a teacher. Some have them in abundance, are well balanced, forceful, sympathetic. They can meet the situation



Printing

Photograph submitted by Robert D. Helsby, industrial arts instructor, State Teachers College, Oswego, N. Y.

in the classroom in a superior way. They are expert teachers. Others are not so fortunate by nature or preparation. The one best informed in subject matter may be the poorest teacher. It may not be amiss at this time to point out that this discussion includes teachers in all kinds of positions. It applies to shop teachers, to those in homemaking, in mathematics, Greek, English, history. It encompasses all who attempt to teach people. No indictment of teachers, superintendents, or school boards is intended here. We are appraising a situation, trying to determine how it happened. No remedy is suggested.

Personal Reflections

And now, a bit of personal comment may be in order. The foregoing discussion is intended to serve as a background or foundation for some statements pertinent to the subject, "I Chose Teaching." The writer should make it clear that no claim is being laid to possession of any excellent qualities referred to in the foregoing. He is trying to explain how he became a schoolmaster, what impulses helped him to determine the choice, and what the view is in retrospect. This at once implies a rather lengthy time in schoolwork. The writer confesses as much. The experiences of life have been varied, both in types of schoolwork and in other occupations. The contacts in other areas in several communities have been many. The opportunities to meet and understand people in their personal and civic activities have been rich and abundant. These experiences make it easier to look with an appraising eye on the work of a teacher and to understand why he chose to become one.

Earlier experiences often determine one's course more than is realized. Certain capacities to appraise these experiences may have a bearing on a later career. It so happened that the writer was privileged to sit at the feet of two remarkable teachers in high school. Both are now retired. One later became a university professor. The other has been president of two universities. Both have unwittingly been ideals for this humble schoolmaster over the years. The writer went to see the latter man after a year in college. The future was doubtful. A nebulous idea was forming that it would be nice to teach school. With some apologies for assuming to aspire to such a position the writer asked his former instructor if it might be possible to learn to be a teacher. The response was both immediate and inspiring. This great schoolmaster said that he looked upon teaching as one of the noblest of professions. That thought and that thrill have remained undimmed through the years. If previous estimates had been about teaching as a job, as a means of livelihood, they were changed. Here was a teacher who thought of his work as a service to mankind, and the writer hoped to emulate him.

Some Rewards

What are the rewards? The writer knows that a community or a nation can proceed better with both feet on the ground. It is fine to get one's head up in the clouds, for the vision is wonderful, but we must walk on the lowly earth. There are some practical problems that must be attended to in any occupation. When a person looks at his job with the large emphasis on selfish ends, the service phases are often overlooked. Particularly now we are considering some rewards in teaching. Perhaps satisfaction ranks highest. This may be what we make it. The following are but a few of the many rewards:

1. *Knowledge of accomplishment* — Back they come, those students of bygone years, telling the teacher of their accomplishments, expressing their appreciation and enthusing with their hopes and aspirations for tomorrow. It is pleasant to be remembered.

2. *Pride in student achievement* — It was Socrates who said, "He is the best teacher whose pupils most quickly outstrip him." The old Greek was right. Happy the schoolmaster today who has earned the commendations of his students and lives to hear them.

3. *Living in character* — The whole world hates a sham. It is easy to appear well in class and to carry a professional air about us while at school. But remaining in character is something more than that. When a teacher has learned to maintain a professional attitude, both in and out of school, he will have little trouble in trying to remain in character.

4. *Community acceptance* — We all like to be respected by our fellow citizens. Doing what is right, even though misunderstood, is sometimes difficult, but the acclaim of the community is inspiring and helpful. Many teachers count it as a priceless reward for good service, to be desired more than fine gold. It cannot be bought. It must be earned by meritorious service.

5. *Intellectual growth* — A true teacher is, along with other characteristics, an older student. When the mind atrophies, the zest and zeal for learning begin to disappear. The look of exultation has gone. Hope and joy are fading away because there are no new hills of learning to climb. Strong teachers continue to grow.

6. *Monetary rewards* — The workman is worthy of his hire. Let us be frank about the matter and say that communities have been lax about the matter of encouraging superior talent to enter the teaching profession. Too long was it thought that anybody could "keep school." Space does not permit a discussion of the matter of salaries here. Economic rewards are a part of the total problem of good schools. In this the community will need to play an increasing part in the future.

7. *Other factors* — To aspire to be a good teacher, one must have an inward drive and proper attitudes besides knowing a given subject. If anyone goes into schoolwork because it looks like a place to make a living, he will not rise above mediocrity. Intellectual growth is not bought with the coin of the realm. We cannot barter for satisfaction. Money alone will not purchase happiness. The teacher who wants to succeed must be prepared to strive unceasingly through the years to teach better today than he did yesterday, and only then will he be happy with the true rewards that will come to him tomorrow.

Conclusion

The title of this article would indicate a confession about a choice of occupation. Confessions are usually phrased in the first person. Thus far the third person has been used almost entirely. It may help to clarify the author's point of view to speak frankly in the first person.

Happiness is where you find it. The road we travel can be beautified, strengthened, and made straight for others to travel if we will make it so. A teacher can do great things in a community if he will. And his accomplishments will bring rich rewards if he has set his eye on the proper goal. If he is lacking in the proper characteristics and is going to be unhappy, in fairness to himself and to the public he ought to leave teaching.

The author again confesses to a lack of many characteristics that he believes a good teacher should possess. But, after the years, if it were my lot to select a vocation again, I would choose teaching.

Twenty-five per cent of all drivers involved in fatal automobile accidents in the U. S. in 1949 were between the ages of 18 and 24. — *The Travelers*, Hartford, Conn.

You are more than four times as likely to be killed in an automobile accident between seven and eight in the evening as you are between seven and eight in the morning. — *The Travelers*, Hartford, Conn.

Hobby Crafts for Adults

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Suggestions are always prevalent in every community for adult craft activity off working hours. School shops have a real opportunity to contribute to this interest. Most men and women are interested in handicraft on a recreational basis; and many will take "time out" after a busy day's work to relax in hand manipulation activity.

This was our experience here on the campus last year. From a survey it was found that metal craft and wood craft, particularly the latter, was of genuine interest. Many names were submitted, but the greatest problem was to select a suitable meeting time. Our solution to this problem was to select the time for which there were the greatest requests. This technique eliminated some of the applicants because of conflicts. Long range planning, however, can correct this problem by changing meeting times annually.

Many professions were represented in our hobby craft group which, in our case, met on Wednesdays from 7 to 9 p.m. It was revealing to note the adult interests in such a heterogeneous group of men and women ranging from post-high school and college years to the middle fifties. In part these interests can be determined by having the enrollee write out an "interest statement" on the first meeting night, and this material may be used as a criterion for methods of procedure. Many more interests were added in the subsequent stages of experience. Some of these first random statements follow:

Woodworking — new and old repair work.
— Machinist, Medical Building.

Woodworking — learn how to operate machines. — Campus R.O.T.C., Instructor.

Want to make a box and a telephone stand.
— Wife of professor, School of Business.

I would like to make small projects in woodwork and learn how to proceed in metal projects. — Stone Cutter, Stone Trade.

Wood turning — make a floor lamp from different kinds of wood (maple, hickory, walnut, and cherry) that I have on hand.
— Professor, School of Medicine.

Primarily interested in learning proper method for use of simple tools as well as becoming familiar with power tools — joining methods, hot glue, mortising, specific project. Use of wood lathe in making a lamp. Possibly a simple end table. — Wife of professor, College of Arts and Sciences (Fine Arts).

Making card table and ping pong table. Other wood repair jobs of miscellaneous household equipment.
— Draftsman, Stone Cutting Trade.

Wood and repair chairs.
— Draftsman, Stone Cutting Trade.

General woodcraft.
— Campus R.O.T.C., Instructor.

Charcoal grill for outdoor furnace, about 28″ x 16″ x 3″. — Insurance Salesman.

I want to refinish and rebuild an old walnut chest that has been crying for attention for years. — Professor, School of Education.

Bookshelves — with top suitable for small record player and radio or lamp.
— Wife of professor, School of Business.

Furniture making — use of power machine.
— Wife of professor, School of Business.

Repair work for home; build material for speech clinic.
— Professor, Speech and Hearing Clinic.

Learn to use and practice in use of woodworking equipment. Make useful articles of household equipment. — Professor of Insurance, School of Business.

We found that in some instances that, if wives started the activity, a few meeting nights later their husbands followed them; and, if the husband started, often a little later his wife would come with an interest to help or start on individual work on her own.

We found one meeting night per week to be the best arrangement, particularly during these busy times.

Materials were somewhat of a problem, but this was solved by having the participant bring the major stock with the laboratory furnishing the small supplies such as wood screws, nails, glue, sandpaper, etc., for a nominal charge, in our case fifty cents.

Perpetuation of adult shop night activity is not difficult because requests, once the program is started, will come in, usually, the first part of the school year. Such has been true here. Already this year we have had requests for another opportunity for craft work. A suggested central theme of "wood finishing and antique identification" has been submitted. Enough requests have

Adult hobby classes

come in for this last interest area for us to develop a shop night activity program on: (1) general wood finishing; (2) identification and refinishing antique and period furniture.

Since the "interest area" has been revealed, it has been suggested that a committee be formed to suggest "topic concentrations" for each meeting night. Participants seem to want technical guidance rather than a long-range work laboratory. With proper information the enrollees can do much of the actual work at home with minimum equipment and the purchase of actual supplies as required. Many have well-equipped workshops at home but appreciate the use of specialized equipment and the information about correct techniques.

One possible committee member has already suggested that we invite an antique specialist for one meeting to give his views on antique identification. So the committee idea serves as a clearinghouse for adult craft interest and is instrumental in setting up a program for the ensuing semester or school year.

In general adults appreciate the opportunity to be able to use facilities as exist in school shops. Industrial arts is missing its mark as a community service if it does not cater to this interest.

Alvin in Wonderland

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As thoughtful teachers and administrators of industrial arts face the second half of the twentieth century they are aware that there are many serious and unresolved issues confronting the profession — issues concerning the validity of certain principles and practices where honest differences of opinion exist. Only a cursory examination of current literature will convince the reader that these issues are troubling industrial-arts leaders today, and that solutions are needed in order that progress may be unimpeded.

There must always be more than one point of view on every issue — otherwise no issue exists. In most cases neither point of view is a hundred per cent correct. Each may have elements of truth, and each may miss the true implications of the problem. The important thing, however, is that the issues be brought into the open — analyzed carefully — and then resolved in a manner that can be accepted by the profession.

Several of these issues are illustrated by the adventures of *Alvin in Wonderland*.

Our hero, Alvin, is a young ex-G.I. who is training to be an industrial-arts teacher. Like most young veterans now, or recently, in our colleges, he is much more mature than the average college senior. He has experienced much in his three or four years in the service — has a breadth of understanding and an ability to "size things up" that a younger and less experienced student might not have. His maturity and experience have led him to question and try to find the answers to the many perplexing problems which confront him as he pursues his training to become an industrial-arts teacher.

Alvin has been assigned to do cadet teaching. In keeping with the policy of his college, he is assigned on a full-time basis for a period of one semester. In the school where he is teaching, however, he finds cadets from other colleges who are assigned for only one or two periods per day or for half a day, the remaining time being spent at the college in regular college classes. And Alvin wonders — "Is it better to be assigned full time, to get the feel of the whole situation, to attend faculty meetings, to become a part of the school and community as I shall need to do as a teacher, or is it better to be assigned so that one may return to the college for courses related to his work, and secure help on problems that may be troublesome?" He wonders. . . .

As a part of his cadet program he is expected to go on periodic visits to other industrial-arts shops. His college instructors and his master teacher have laid much stress on the selection of subject matter in terms of the total growth pattern that is desired for the students. It has been pointed out to Alvin that this growth pattern is measured in terms of the behavior changes which take place in the student and it is closely related to an analysis of all of the objectives of his subject. And yet, on one of his visits, when Alvin asks the teacher a question concerning what he is trying to achieve, he is shown a course of study based on a trade analysis of the activity being carried on. And Alvin wonders — "Can it be that the total growth pattern is comprehended within the limits of the processes and operations, and the related technical information indicated by such an analysis? What about the behavior patterns that relate to consumer knowledges, to recreational activities, to social relationships? Are they not as important as the ability to saw to a line or to plane a square edge?" He wonders. . . .

Assigning Projects

As he visits various schools, Alvin also sees various methods for assigning projects. In one school he notes that the projects are all assigned, and that the instructor has a perfectly finished model of each in his display case for use in introducing the project to the class. He sees another school where the first two or three projects are required, and then the students are allowed to choose from a list which the teacher provides, and for which drawings or plans are available. In still another school the students are allowed a free choice of the projects which they make, and the teacher spends a considerable amount of time helping them prepare and work out their designs. He notes that in the first two instances the students appear to be developing skills more rapidly than in the latter case, but that the students seem less interested in what they are doing. He wonders which method promotes the greatest degree of all-round growth on the part of the student. He senses that in the first two instances the teacher seems much less busy and the classes are perhaps more orderly. He wonders which method he should use when he starts to teach.

While considering this problem he notes another factor that had at first escaped his notice. In the case of the first two teachers, the models and plans for the projects were furnished by the teacher. The student knew exactly what to make, and the directions for making it were available in the form of a project sheet or textbook explanations. In the case of the third teacher, however, the teacher not only did not furnish such instructions, but the pupils were required to make their own plan sheets indicating how they expected to construct the project or do the job. Alvin wondered how this could be accomplished with young students who had little experience with mechanical processes. Then he remembered that his psychology instructor had remarked that the only way to learn to do a thing was by doing it

and that this applied to thinking and problem solving as well as manipulative skills. And again Alvin wondered which method he would use when faced with a classroom situation. He recognized that it was much easier to give students full directions, and then simply check through to see that they were followed, but he felt that in some way the student who did his own planning was making far greater progress than the one who simply followed directions. And he wondered if perhaps it were not even more important that a student be able to plan a project than that he be able to make it.

Industrial Arts on the Elementary Level

Recently Alvin visited a school where he found the industrial-arts teacher in one of the grade classrooms helping the children and the teacher construct a store which was to play an important part in a unit which the grade was studying. This was somewhat of a surprise to Alvin for he had never thought of such activities as being the industrial-arts teacher's responsibility. Later in this same school he observes a class of fourth-grade children in the industrial-arts shop working on a variety of projects. This leads Alvin to wonder just what the contribution of industrial arts to elementary education may be. "Is there a place for industrial arts at the elementary level? What are its functions and aims? By whom should it be taught? Where should it be carried on? Why are so few examples of good industrial arts at the elementary level evident?" All of these questions trouble Alvin, and thinking over what he has seen, he wonders if there are perhaps two types of activities suitable for this level — one, those activities which relate to the unit being studied in the classroom, like the building of the store, and which are carried on under the direct guidance of the classroom teacher with the help and advice of the industrial-arts specialist; the other, a chance for pupils to express themselves in various media, simply for the recreational outcomes involved, and the opportunities afforded for individual success and achievement. Such activities might well be carried on in a special room or shop under the direction of the industrial-arts teacher. He decides that the whole issue of the place of industrial arts at the elementary level is an extremely important one, and decides to explore this further when he returns to college.

While debating this question, Alvin senses that there are several other problems directly related to the grade placement of industrial arts in the public school curriculum. He has observed some schools where industrial-arts classes are found only in the seventh and eighth grades, others where they appear throughout the junior high school span, and still others where courses in this area are available throughout the senior high school. His knowledge of the broad objectives of industrial arts leads him to believe that opportunities for growth through these activities could continue at all levels, and he wonders why one finds so many diverse practices in the grade placement in various schools and communities. "Surely," he thinks, "someone must know the span over which industrial-arts activities can be educationally effective."

It is common practice to ask cadet teachers to sponsor a club activity in the school where they are assigned. They welcome this opportunity as another means of experiencing the total school situation. When Alvin was asked by his master teacher what kind of a club he would like to sponsor he could not decide immediately and asked time to consider the matter. He thought of all of the activities in which he was proficient — he might suggest a model airplane club, a model racing club, a scout merit badge club — any one of these would be a challenge but none seemed to "click." Then his landlady remarked, after seeing Alvin at work on some of his demonstration models, that she wished her daughter could take industrial arts. This was the idea he had been looking for! Next morning he told his master teacher that he would like to sponsor a girl's craft club. The master teacher was somewhat skeptical but was willing to give it tentative approval. Accordingly the announcement was made in assembly, and the next Tuesday a group of 14 senior high school girls reported. As the program gets under way, Alvin is amazed at the interest, the enthusiasm, and the ability of the girls to carry on those activities which have usually been available only to boys. The more he observed the more he wonders, "Industrial arts is supposed to be general education — general education is supposed to be for everyone — this certainly means girls as well as boys." And yet, in all of his experiences, Alvin has never seen girls in an industrial-arts class. He senses that this is partly due to the fact that industrial-arts activities have been developed to meet the needs and interests of boys, and that seldom if ever, has there been an attempt to develop activities which would appeal to girls. "Surely," Alvin thinks, "there is as much reason for girls to take industrial arts as boys in this civilization which surrounds the homemaker and the office worker with a multiplicity of mechanical gadgets which must be operated and understood. Why then do we not have more girls in our industrial-arts classes, or special industrial-arts classes for girls?" He wonders. . . .

(To be continued)

Jewelry work

Photograph submitted by Robert D. Helsby, industrial arts instructor, State Teachers College, Oswego, N. Y.

Industrial Arts and Vocational Education

John J. Metz, Editor

THAT BOGEY — PRODUCTION WORK

Have your ever heard an industrial-arts teacher indignantly exclaim "I don't want production work in my shop — I want instruction." I believe every teacher of industrial arts will agree with him, and so will every good teacher of any other subject.

The teacher of arithmetic does not want his pupils to check up the bills for the corner grocer day after day. Nor does the teacher of printing want his boys to print only from electrotyped cuts for school forms.

But do not judge production work in the school shop too harshly. It has its place and serves a valuable purpose. Naturally, when the beginner comes into a woodworking shop, it is preposterous to put him directly on production work. He must first learn how to do the basic operations with simple hand tools. He should get some taste of what it means to make "something." He must learn how to plan his work, how to choose necessary materials, how to follow a blueprint, written directions, etc.

Production work in the industrial-arts shop, however, must never and need never interfere with instruction if the instructor has planned his course so that it is flexible enough. This means that the instructor has determined a place in his course for this type of work. His planning also must be so thorough that it will never allow the students' work to become mere repetitive operations with hand or power tools.

"How can one plan for production work when its nature is not known at the time of planning?" may be asked. It is true, the planning cannot be done as specifically as would be the case if the kind of production work were known from the outset, but it is well to have the outline of the course show that some of this work is included. Then, when a maintenance job or a production job comes up, the instructor must be clever enough to know how to introduce the work so that the students will be interested in tackling it. Then, too, the instructor must know what students are best fitted to be set at the given job. Youngsters usually like to do something that presents a real challenge.

Some instructors have even been successful in developing maintenance clubs as extracurricular activities in their industrial-arts classes. The students were interested enough to devote out-of-school time to these jobs.

Production work is worth while if the teacher is strong enough to make it so, and to keep it from dominating the instructional shop activity.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

It is deplorable and yet understandable that academically trained teachers and school administrators should fail to see the value of the industrial-arts courses taught in some of our schools. It is very difficult to explain, however, why there should be the animosity that comes out in the open from time to time between those who teach industrial arts and those who teach vocational education.

It is true, the objectives of the industrial-arts subjects are different from those that underlie the vocational subjects, but many of the basic processes and materials, as well as the related material used in the two fields is very similar. Why then the hard feelings that crop out so often?

The problems that are met with in the industrial-arts shop very often are the same as those that crop up in the vocational classes. Surely there is every reason why teachers of industrial arts and vocational education should meet to discuss and solve common difficulties.

The question becomes still more disturbing when one remembers that teachers in both fields get their training from the same instructors and in the same kind of teacher-training institutions. Probably because they are so nearly akin, they feel that they must have the animosities that are so often found between natural brothers and relatives. It is high time for all of us who are engaged in industrial arts and vocational education to take a sane attitude toward the relationship which exists between our two fields and present a common sense understanding of the similarities and differences of our special educational offerings. It is bad enough that the academic teachers and administrators do not look kindly at us; let us not feel antagonistic against our brothers in the related fields of our work.

As in every other field, the more we associate intimately with our neighbors the more we get to know them and the easier it is for us to understand them and their actions.

Some of our state associations of industrial arts and vocational education have for years held their conventions together. Their success has provided excellent examples of what united efforts can do. They eat together, attend the same general sessions, and find many points of common interest, not only in their work, but in the social events that they enjoy together.

Their example ought to be followed more generally. Industrial arts and vocational education should always present a united front.

DANGEROUS SOLVENTS

As colder weather approaches, ventilation problems will again become more numerous. Some of the finishing solvents are not only dangerous because they are explosive and flammable, but they may also be toxic.

The dangers involved are such that every shop teacher ought to make a study of the use of solvents in his own shop. Are they dangerous to the health of your students? Are they fire hazards?

Do not wait until an accident has occurred. Prepare to avert dangers by seeing that noxious vapors are drawn out of your shop before they do harm. Know what solvents you are using. If the manufacturer's label carries a warning, do not question or experiment with the product. Just follow instructions to the letter. Your life, the lives of your students, and your school building are too valuable to take chances.

The industrial-accident lists the country over annually show that not enough attention is being paid to making the use of solvents safe for the workers, and the carelessness of the workers themselves makes the problem still more difficult.

Be sure that your school is ahead of industry in this important matter, and train your students to handle solvents safely.

Some Leaders in Industrial Education

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(Continued from page 310 of the October, 1950, issue)

William Luther Hunter (Concluded)

To aid in insuring and maintaining what he regarded as the necessary standards of research in graduate study, Hunter prepared and distributed in the fall of 1936 a 65-page manual for graduate students, entitled, *Research Problems and Methods in Industrial-Arts Education*. In this "Syllabus and Work Book" he brought together from various sources, in addition to his own contribution, material on assignments in graduate study, suggested problems for research, a rating scale for research, rating scales for theses, and other pertinent helps and suggestions, including ten pages of selected references.

Other Writings

Going through the file of publications which I deposited in the supervised teaching library at the time of my retirement as head of the department of industrial education, I find about a score of bulletins and reports, in addition to those I have selected for mention here, which were prepared and distributed by Hunter during his relatively short period of service at Iowa State College. One can only marvel at the quality, as well as the quantity, of his works. How he would have enriched the literature of our field, and what a contribution he would have made to the progress of industrial arts and industrial education, had he been spared to complete a normal career to age 65!

Among his writings in more permanent form, mention should be made of a series of eleven sets of *Shop Tests*, two volumes of *Shop Problems in Blueprint Form*, *Bird-House Problems in Blueprint Form*, and *Puzzle Problems in Blueprint Form*. In addition, he contributed to the professional journals a list of articles and editorials too lengthy to be catalogued here.

The Poetry of Craftsmanship

In an earlier paragraph I referred to Professor Hunter as an *individual* — as one possessed of distinctive characteristics, differing markedly from his associates and other leaders with whom it would be natural or appropriate to compare him. One of these distinctive traits, which marked him off from most of his colleagues, and from most of the industrial-arts men I have known through the years was his interest in poetry. He was never obtrusive about this, and I have no doubt many of his friends know little or nothing of this hobby, if that be the appropriate word.

Only on rare occasions did he read his own poetry before audiences, although he did so more frequently in his classroom, and when entertaining guests in his home. I recall one memorable occasion when he visited Kansas State Teachers College. When I saw a magazine announcement of a speaking engagement in Oklahoma, I wrote to invite him to make a stop in Pittsburg en route. When he accepted, I appointed a committee to make the necessary arrangements, and the department of industrial education gave a dinner in his honor on Tuesday evening, November 1, 1938. Following the dinner, he spoke for an hour or longer on the subject, "The Poetry of Craftsmanship," at which time he read from his own creations, as well as from others which he had collected from various sources. He was in excellent spirits, and his visit to the Department was one of the outstanding events of that fall.

A few of Hunter's poems were published in *Industrial Education Magazine*, and from these I select two to illustrate this phase of his life and works. The first was accompanied by an introductory statement by the editor, from which I quote two sentences:

"We wish to call attention to the flowing, singing verses that he is producing, and to say that he is the first we have seen to possess these qualities and at the same time to write from the shop teacher's viewpoint. He stands for fine craftsmanship; his lines reveal a wholesome understanding of human nature; he writes as a good sport and a reverent worker; and his imagination gives a touch of beauty to the commonplace."[1]

The Cabinet-Maker[2]

I met a fellow the other day;
A cabinet-maker by trade they say.
His face lit up as I shook his hand;
No jollier fellow in all the land.

With screws and wood and nails and glue
He works to the motto, "The Best You Can Do."
He sings as the shavings fall from his plane,
For he works for pleasure and not for gain.

Each piece must be true — as true as can be,
And the joints that he makes fit perfectly,
He has saws and chisels, bevel and square;
They all do their work and are handled with care.

* * *

Be ye king or prince or potentate high,
This man with you no never shall vie;
His happiness, friends, he ever shall stake
On the joy to be found in what he can make.

The second example, published seven months later, deals with the high school boy and his industrial-arts teacher.

In Step[3]

A boy comes to shop full of "ginger" and "pep";
He's so anxious to work that he can't keep in step,
He wants to make things far "over his head,"
His hunger for knowledge must somehow be fed.

You know that you too were once but a youth
(perhaps you don't look it, but yet 'tis the truth);
A boy is not nearly so green as he looks —
Your actions he reads as scholars read books.

He comes to the shop expectant and eager
To get to the bench and be his own leader.
The average boy is a red-blooded chap;
If you'd be his idol you'll find it no snap.

[1] Editorial, *Industrial Education Magazine*, Vol. 25, No. 12, June, 1924, p. 334.
[2] *Ibid.*
[3] *Industrial Education Magazine*, Vol. 26, No. 7, Jan., 1925, p. 188.

You as a teacher must show him the way;
Make the boy work, but don't let him play;
Encourage his interest and "ginger" and "pep,"
But let him know too that he must — keep in step.

One more example may be selected to suggest something of the wide range of ideas and method of treatment.

The General Shop[4]

The general shop is a mighty good plan
To make of a boy a suitable man,
A place where he does more things than one,
The jobs that in life will have to be done.

A shop where he can just sort of explore
To see what trade he's best suited for,
To grasp somewhat of a bird's-eye view,
The tricks that old folks wish they knew.

The essential things in more than one line —
Not a tradesman — no, there's not enough time,
But sufficient to guide the future man
In the making of his own life plan.

To aid those who wish to pursue this trait further, I may cite eight additional short poems which were published in *Industrial Education Magazine:*

"That Jointer," June, 1924, page 334.
"Your Shop," October, 1924, page 383.
"The Whole of America," January, 1926, page 225.
"The Log," February, 1926, page 258.
"If the Doctor," June, 1926, page 390.
"Christmas," December, 1926, page 171.
"The Winner Never Quits," May, 1927, page 363.
"The New Year," January, 1928, page 229.

Activity in Professional Organizations

In conclusion, I summarize briefly Professor Hunter's contribution through his activities in professional organizations. I have already mentioned his membership in the Manual Arts Conference of the Mississippi Valley. In addition, he was a member of the National Education Association, the Iowa State Teachers Association, the American Vocational Association, and the Western Arts Association. He was one of the leaders in the Industrial Education Section of the Iowa State Teachers Association, serving as member of important committees, and as president, 1929–30.

He was a member of Phi Delta Kappa, national honorary graduate fraternity in Education; Iota Lambda Sigma, national professional fraternity in Industrial Education; and Epsilon Pi Tau, international honorary society for students majoring in Industrial Arts.

I believe I am justified in saying that William L. Hunter would be generally classed among the 12 or 15 outstanding industrial-arts leaders of his day.

Methods of Research

Professor Hunter emphasized educational research in the graduate work at Iowa State College. One of the requirements was that every candidate for the master's degree must submit a satisfactory thesis. This is not the time nor the place for a discussion of the merits of this requirement, although I have some ideas on the subject, based on nearly 40 years of more or less intensive study. In the summer session of 1934, as a guest professor of Kansas State Teachers College, I was invited to assist in the formulation of a program of studies leading to the degree of M.S. in industrial education.

In submitting my recommendations, I wished to support them by a summary of practices and procedures in other graduate schools. In my requests for data, among other items, I inquired about the thesis requirement. In answering my questionnaire, Hunter must have remembered that in the discussions at meetings of the Manual Arts Conference I sided with what seemed to be the majority opinion that, in cases of some candidates at least, certain other requirements or disciplines may be more significant than the experience of writing a thesis. In preparing his reply, Hunter described the procedure at Iowa State College, namely, the requirement of a thesis, and added, "There has been no lowering of standards of graduate study here!"

I remember this little "passage-at-arms" as more or less typical of Hunter's willingness to "stand by his guns" — if I am not becoming too controversial! It was characteristic of him to think things through to conclusions, and he was always ready to marshal the reasons for any course of action, and to support them vigorously in debate, always in the best of humor and good will.

(To be continued)

[4] *Industrial Education Magazine*, Vol. 26, No. 10, April, 1925, page 290.

Industrial Arts Curriculum To Improve Housing

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The outline presented here, is of suggestive materials for use in the industrial-arts curriculum to improve housing conditions. The amount of time allotted to the program by the individual instructor, to any or all of the areas, will determine the thoroughness with which each or all of the areas may be covered.

Materials and areas treated were selected from a wide range of published and unpublished theses, dissertations, articles, books and periodicals, as well as from the studies of many who have written about housing and its implications with regard to education.

The writer has followed much of this outline in his industrial-arts classes at Eustis High School, Eustis, Fla.

OUTLINE OF SUGGESTIVE MATERIAL FOR PROPOSED CURRICULUM

Selection — Choosing and Investigating

1. *Who should own a dwelling:* (*a*) long term stay, (*b*) financial background or status.

(*c*) personal habits, (*d*) vocation.

2. *Who should rent a dwelling*

3. *Requirements of ownership:* (*a*) ability to pay, (*b*) income, (*c*) type of vocation, (*d*) investment.

4. *Location of dwelling:* (*a*) location, (*b*) stability of environment, (*c*) prevailing breezes, (*d*) direction of sun's rays, (*e*) transportation, (*f*) public services, (*g*) schools, (*h*) zoning, (*i*) service access, (*j*) sanitation, (*k*) facilities, (*l*) shopping center, (*m*) external nuisances, (*n*) ground conditions.

5. Finding and investigating ready-built home: (*a*) reputable realtor, (*b*) use of check list in evaluating: location, construction, design, livability, fixtures, hardware, depreciation, construction costs, furnishings, light and air, real estate cycles and trends.

Costs and Values

1. *Cost of ownership:* (*a*) paying for interest and principal, (*b*) insurance, (*c*) depreciation and repair, (*d*) facilities: water, waste disposal, electricity, gas, heating; (*e*) grounds development, landscaping, (*f*) furniture and implements.

2. *Estimating construction costs:* (*a*) amount of materials, (*b*) type of materials, (*c*) application, (*d*) economy in use, (*e*) cost per cubic foot, (*f*) labor, (*g*) design, (*h*) zoning restrictions, (*i*) licenses, (*j*) legal costs, lawyer, stamps and others.

3. *Estimating property value:* (*a*) developed and undeveloped, (*b*) paved streets, (*c*) sidewalks, (*d*) hydrants, (*e*) general environment, (*f*) land conditions, (*g*) zoning restrictions, (*h*) size of lot and direction it faces, (*i*) *improved* and *unimproved* areas.

Financing

1. *Legal aspects:* (*a*) mortgage insurance, (*b*) attorney's investigation, (*c*) various types of mortgages: short term, long term amortized; (*d*) land survey, (*e*) payments in proportion to income on basis of $150–$200 monthly income: food, 30 per cent of income, shelter, 25 per cent of income, clothing, 13 per cent of income, operating costs, 15 per cent of income, other costs, 17 per cent of income; (*f*) budget preparation, (*g*) avoid borrowing on second mortgage, (*h*) home protection funds for contingencies, (*i*) financing agencies: government, commercial; (*j*) protection by insurance.

Architect's Services

1. *Selection of the architect*

2. *Duties of the architect*

3. *Information the architect needs regarding client:* (*a*) amount to be spent, (*b*) number in family, (*c*) age of members of family, (*d*) family habits and centers of activity.

4. *Specifications*

5. *Fees*

6. *Advantages of hiring an architect over buying finished home*

DESIGN

1. *Architectural styles and developments in the United States:* (*a*) adaptation to materials and climate, (*b*) turn to functional architecture, (*c*) history of American architecture.

2. *Design in homes for:* (*a*) safety: fire, collapse, general; (*b*) flexibility, (*c*) proportion, unity and balance, (*d*) beauty, (*e*) ease of living, (*f*) suiting family habits and activities, (*g*) durability: of materials, of investment.

3. *Trends:* (*a*) standardization, (*b*) prefabrication, (*c*) new materials, (*d*) city planning, (*e*) developers' sites, (*f*) housing *core* development units containing plumbing and heating, (*g*) radiant heating.

4. *Unit design:* (*a*) entrance: lighting, minimum size, 3 ft., *lookout,* shelter recommended, coat closet desirable; (*b*) living room: size and shape, living-dining room combination, furniture grouping: fireplace, corner, reading, wall, writing, music; (*c*) dining room: "L" shape joining living room, dinette, kitchenette, separate dining room, dwarf wall separation between living and dining room, unbroken connection with living room; (*d*) kitchen: efficiency and beauty, general location, equipment dimensions, equipment placement for ease of work, storage space, lighting, flooring, ventilation, centers for: work, receiving and storage, preparation, serving, dining, types: *U* most satisfactory, *L* acceptable, along one wall least satisfactory; (*e*) bedrooms: master bedroom, guest, child, closet development for maximum storage: built-in wardrobes, "storage wall"; (*f*) bathrooms and lavatories: accessibility, privacy, fixture types, sound deadening, floor finish, wall finish, trends: glassed showers, compartment bathroom; (*g*) porches: living porches for Florida: front and back, breezeway connection with garage, screening, other enclosure devices: jalousies, louvers, storm windows.

ESSENTIALS OF CONSTRUCTION

Physical Properties and Applications

1. *Foundations:* (*a*) necessity: avoids settling, firm support, stability; (*b*) types: piles, spread footings, piers, slab; (*c*) care in site selection in reference to foundations; (*d*) specifications, general: footing for concrete block: 4 in. wider at both sides than the blocks, 12 in. thick, adequate for live and dead load, concrete in 1-2-5 mix of cement, aggregate, and sand, for building 30 ft. high or more, footing 4 in. thicker than resting wall; (*e*) repair and maintenance: reinforcing sagging beams or joists, termite inspection and shielding, decay prevention.

2. *Sills, beams, and joists:* (*a*) purpose: support of flooring, dead and live loads; (*b*) clearance from ground level: 18-in. minimum, access, or *creep* space, air and light aids prevention of dampness, rot, and termite activity; (*c*) bridging and tying: for strength, stability; (*d*) firestops, (*e*) materials: wood, steel, reinforced concrete.

3. *Flooring:* (*a*) materials: wood, concrete, linoleum, tile: fired clay (tile), asphalt, rubber, others: cork and similar products; (*b*) proper application; (*c*) repair and maintenance.

4. *Walls, exterior and interior:* (*a*) exterior walls: materials: wood, concrete block, red brick, tile, adobe, others: aluminum siding and similar prefabrications; application of types: frame, concrete block, stucco, frame and stucco, brick and brick veneer, others; (*b*) interior walls: materials: plaster, plywood, prefabricated sheet materials, exposed woodwork, exposed structural block, stucco, application, repair and maintenance.

5. *Roofing:* (*a*) application of types, (*b*) pitch, (*c*) attic treatment, (*d*) insulation value: materials: shingle, wood and asphalt, felt, concrete tile, other tile, other materials: metal and similar sheet coverings, repair and maintenance.

6. *Fenestration:* (*a*) types of windows: single and double hung, casement and others, (*b*) advantages and disadvantages in relation to climate, (*c*) repair and maintenance.

7. *Indoor climate:* (*a*) ventilation, air motion and cross ventilation; (*b*) cooling: ducts, fans and blowers, insulation; (*c*) heating: ducts, floor register, central location, hot water system, one pipe, split systems, fireplace, others: fuels and heating systems; (*d*) design considerations: prevailing breezes, sunlight.

8. *Electrical services:* (*a*) lighting, types of fixtures: bathroom, dining room, kitchen, living room, outdoor, direct versus indirect lighting, amount of light needed; (*b*) service, outlets for: basement, bathroom, bedroom, dining room, entrance, garage, kitchen, living room; types: fixed single or double, strip; (*c*) repair and maintenance.

HOME MECHANICS

Plumbing

1. *Theory of installation of internal water supply and waste disposal*

2. *Home repairs and maintenance:* (*a*) faucet leak repairs, (*b*) pipe leak repairs, (*c*) flushing tank bulb leaks, (*d*) garden hose, (*e*) drain trap.

3. *Sanitary privies.*

4. *Sanitary drinking water*

Electricity

1. *Appliances:* (*a*) cords and end plugs, (*b*) lamps, (*c*) door bells, (*d*) fuse replacement, (*e*) switches.

General Repairs and Maintenance

1. *Finishing and refinishing:* (*a*) preparing and varnishing old floors and woodwork, (*b*) preparing surface and painting cement floors, (*c*) preparing old surfaces and repainting woodwork and steel sash windows, (*d*) waterproof finishes, (*e*) painting hot water pipes and radiators, (*f*) care of brushes.

2. *Furniture repairs:* (*a*) gluing broken furniture, (*b*) construction and repair of simple cabinets and shelves.

3. *Screens:* (*a*) repair, (*b*) installation.

4. *Windows and blinds:* (*a*) "easing" movement, (*b*) glazing.

5. *Fitting doors:* (*a*) locks, (*b*) hinges.

6. *Landscaping essentials or fundamentals*

7. *Plaster repairs*

8. *Simple concrete work:* (*a*) patching, (*b*) constructing: seats, stairs, walks and drives, foundations.

Interior Decoration

Color application: (1) walls, (2) ceilings, (3) trim, (4) color dynamics.

Furniture: (1) types, (2) arrangement and grouping, (3) scale, (4) flexibility.

Drapes, wall covering, rugs and carpets

Pictures and other decorative arts

PATTERNMAKING AND FOUNDRY WORK IN THE GENERAL SHOP

HARVEY D. MINER

Industrial-Arts Instructor

Bowling Green State University

Bowling Green, Ohio

(See also pages 310–312 of the October, 1950, issue)

Tempering and Preparing Foundry Sand

General Information:

The molding sand must be properly prepared before a pattern can be molded. The sand must be correctly moistened (tempered) so that it will hold together and form a recess (mold) after the pattern has been drawn out. Care should be taken when adding water to be sure that the sand has been moistened to a point where it will pack readily in the hand, and when broken apart, will make a clean sharp break. If the sand is too dry it will fall apart. If it is too wet it will become soggy and cause the pattern to stick in the mold. Wet sand may even cause steam to form in the mold and often when hot metal is poured into it, a small explosion may occur or sand holes will develop.

Steps in Tempering Sand:

1. The sand must be moistened sufficiently to make it adhere well.
2. Too much water will cause it to become mushy and sticky.
3. Level the sand in the bin or on the floor with a small scoop or foundry shovel.
4. Moisten the sand with water fed from a sprinkling can. An open can may cause the sand to become lumpy resulting in more work in correcting conditions.
5. Add just enough water to make the sand adhere well and pack firmly.
6. When the sand can be packed well in the hand and this lump can be broken with a clean sharp break, the sand has been properly tempered.
7. The sand must be continually mixed (cut) while you are adding the water.
8. Be sure that the sand is properly tempered before trying to ram a mold.
9. Too little water in the sand will cause the mold to fall apart or collapse when assembling and handling.
10. Too much water may also cause steam to form in the mold when hot metal is poured in. The result may be a small explosion or "blow holes" to form in the castings.
11. The temper of the sand must always be tested before a mold is rammed.
12. When the casting has been removed from the flask, be sure that all lumps are broken up before placing the sand back in the bin or in the pile on the foundry floor. Lumpy sand means added work for you.

Ramming a Mold

General Information:

It is essential that you follow proper procedures when ramming a mold to assure a good casting. The sand must be properly tempered before the sand can be properly rammed into a good mold. If damage is done to the mold in the process of ramming, it is essential that repairs be made before pouring. We should follow the normal steps when making a good mold.

Steps in Ramming a Mold:

1. Be sure that the sand is properly tempered.
2. Place the drag half of the flask on the mold board (bottom board) with the aligning pins pointed down.
3. Place the pattern on the mold board in the center of the flask. Cover the pattern lightly with parting.
4. Sift fine sand over the pattern with a riddle to a depth of approximately 1 in.
5. Fill the drag half of the flask with sand from the bin or floor and tamp firmly with the rammer.
6. Continue adding sand and ramming until the flask is full.
7. Level off the sand with a straight edge.
8. Place a second mold board on the drag (follow board) and turn the flask over.
9. Remove the bottom board carefully. This will expose the pattern.
10. Smooth off the surface carefully with a spatula so that the pattern and mold are level.
11. Now place the upper half of the flask (cope) over the drag. Be sure the pins line up with the guides.
12. Place a sprue pin approximately ¼ in. from the pattern. This pin should be set in the sand just deep enough to hold it in an upright position.
13. Cover the entire surface of the sand and pattern with a material called "parting sand." This aids in the parting of the mold.
14. Riddle approximately 1 in. of fine sand over the pattern.
15. Fill the flask with sand direct from the floor or bin and ram firmly. Do not ram too hard or the flask may be forced in an upward direction and the sand may be packed too tight.
16. Most molds should be vented by piercing holes in the sand with a wire until the wire barely reaches the pattern. The holes should not touch the pattern.
17. Lift the cope carefully from the drag and stand it on edge at one side of the molding bench.
18. Remove the sprue pins from the cope and form a funnel by hand at the top of the hole thus formed. This will be the pouring basin.
19. Dampen the sand slightly around the pattern with water from a bulb sponge which will aid in removing the pattern and not tear the mold.
20. Place the draw pin in the center of the pattern and lightly tap it in all directions with a small block of wood or bar of metal. This is called *rapping* and will loosen the pattern in the mold.
21. Draw the pattern carefully from the mold by gently lifting on the draw pin in a vertical direction.
22. If any defects occur during the drawing process, repairs may be made with a spatula, trowel, or slick. Surplus or loose sand should be blown from the mold with a bellows.
23. Cut a channel (gate) in the mold from the pattern to the sprue hole with a small *U* shaped piece of tin.
24. Place the cope over the drag carefully. Take care so that the cope is not dropped.
25. Now place the mold on the floor and allow to dry for a few minutes. It is ready to pour.

Pouring the Casting

General Information:

1. Be sure that the metal is properly melted and of the correct pouring temperature.
2. Make sure that all ladles are prepared and all handles are secure.
3. Never remove a crucible or ladle from the furnace until you have a firm grip on it.
4. The mold should be placed on a concrete floor for pouring. Never pour a mold on a wood floor unless it is properly protected with metal or asbestos.
5. Clamp the parts of the flask together before pouring. Forgetting to do this may cause a *run out*.
6. Be safe — wear asbestos leggings, shoe guards, and goggles when pouring molten metal.
7. Once you have started to pour the metal continue the pouring until the mold is full.
8. Do not remove the casting from the mold until it has had ample time to cool.

Removal at an earlier time may cause warping of the casting.

Pouring the Mold:

1. Before pouring is started a thorough understanding of the foregoing information is important.
2. When placing the mold on the floor, care must be exercised to eliminate possible damage to the mold.
3. Remove the ladle or crucible from the furnace.
4. Begin pouring at a level as near the flask as possible without touching the flask. This will eliminate splash.
5. Once the metal has begun to flow, continue the pouring operation until the metal completely fills the mold and sprue.
6. Do not touch the casting until it is cool and solidified. Cooling time varies from a few minutes for soft metals to several days for harder metals.
7. Never touch the casting until you are sure that it is cool. In case of doubt use the tongs.
8. Place the casting to one side of the area away from inquisitive fingers. Place the *hot* label near it.
9. Best results are obtained if the casting is allowed to cool normally. It is not good practice to cool in water or under a faucet.
10. When the casting has cooled, it is ready to be transferred to the shop for final finishing.

TOOL KITS FOR LEARNERS, WORKERS, MANAGERS, AND SUPERINTENDENTS

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Specialist and Consultant
Minneapolis, Minn.

Tool kits are needed to do the work of the world and these tool kits are required to control the three *M's:* muscles, materials, and minds.

Both workers and bosses need tool kits to control these three *M's.*

The American Society of Mechanical Engineers defines management as "The art and science of preparing, organizing, and directing human effort applied to control the forces and utilize the materials of nature for the benefit of man."

This definition gives us the three *M's.*

1. Controlling minds: "preparing, organizing, and directing human effort."
2. Controlling muscles: "control the forces."
3. Controlling materials: "utilizing the materials of nature."

Tool kits of operative tools like screw driver, saw, brush and comb, wrench, pliers, pen, typewriter, hammer, and file are used to control muscles and materials.

Tool kits of speculative tools like the yardstick, interest tables, decimal equivalent tables, blueprints, gauges, slide rules, and many devices like sheets, drawings, etc., are used to control minds.

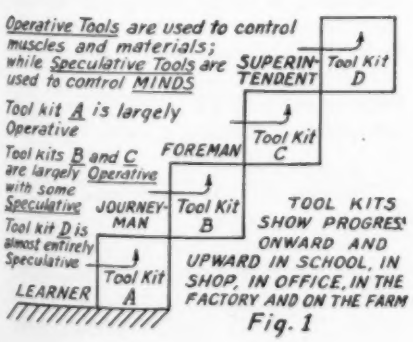
The tool kits mentioned in this article have been tried out in high school, in college, in trade schools, and out in the field of employment. The tool kit of speculative tools will aid in both life adjustment and in employment adjustment.

Many centuries ago man applied his muscles directly to the materials. See Figure 2. He lifted stones by sheer strength; he dug holes with his hands; he shaped pottery or made designs in clay or on clay tablets with his fingers.

Next he fashioned tools and learned how to use these tools. See Figure 3. These tools work between the muscles and the materials, and control both.

With tools, the worker may increase the quantity and/or the quality of the material handled. Note that in most cases the introduction of tools between muscles and materials decreases the call on the muscles but increases the call for skill.

Figure 4 shows how the quantity and/or quality of the material increases with the


Operative Tools are used to control muscles and materials; while Speculative Tools are used to control MINDS
Tool kit A is largely Operative
Tool kits B and C are largely Operative with some Speculative
Tool kit D is almost entirely Speculative
LEARNER
JOURNEY-MAN
FOREMAN
SUPERIN-TENDENT
Tool Kit A
Tool Kit B
Tool Kit C
Tool Kit D
TOOL KITS SHOW PROGRESS ONWARD AND UPWARD IN SCHOOL, IN SHOP, IN OFFICE, IN THE FACTORY AND ON THE FARM
Fig. 1

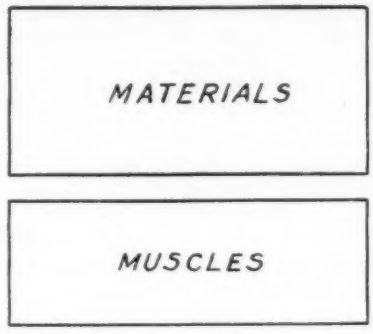


Fig. 2

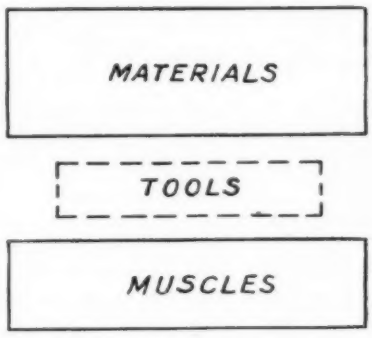


Fig. 3

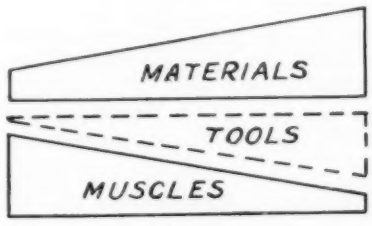


Fig. 4

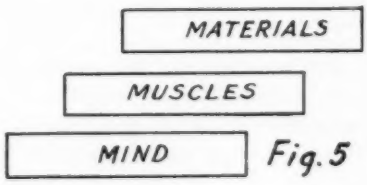


Fig. 5

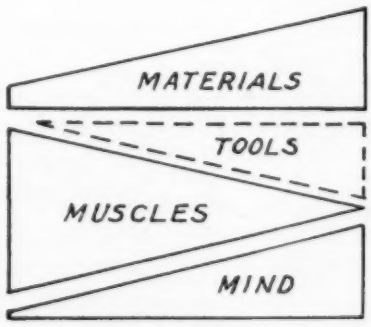


Fig. 6

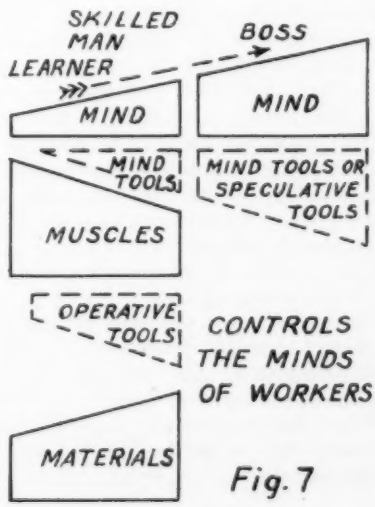


Fig. 7

increase of tools, while the muscular strength decreases, although the muscular skill increases.

Where Does the Mind Enter Into the Picture?

Figure 5 shows how your mind controls your muscles, and in turn your muscles control materials. Your mind tells your muscles to pick up a stone, and your muscles pick it up. Now when the mind tells your muscles to pick up a very large stone, what happens? Since the muscles cannot lift the stone, the mind tells the muscles to use a tool, for instance, a lever.

Figure 6 shows how the mind enters still further into the picture. You will note the following changes as the learner uses his mind more, tools more, and develops greater skill. He needs to use less and less strength but more and more skill; either more material or finer work, or both result. With the introduction of automatic machinery the call for muscular strength seems to be on the way out, while the call for better minds and very high skills is definitely on the way in.

Now, as long as you control your own mind to control your own muscles to control materials you are a worker. When you begin to control the minds of others you become a *boss*.

As a *boss* you control muscles and materials indirectly. See the management definition at the beginning of this article. The boss controls the minds of others, and these others use their minds to control their own muscles which in turn controls materials.

The worker uses his tool kit of operative tools to control his own muscles to control materials. See Tool Kits *A*, *B*, and *C* in Figure 1. This operative tool kit usually contains some *mind tools* for controlling his own mind.

However, the boss must have a more extensive tool kit of *mind tools* or *speculative tools*, while the boss's tool kit may contain very few operative tools.

Figure 6 shows how the changes progress from learner at extreme left to skilled worker at extreme right. Little mind, lots of muscle, few tools and little material on the left. Toward the right the mind increases, muscles decrease, tools increase, and materials increase.

Figure 7 shows the progress from learner to skilled worker to boss.

The learner starts with only his muscles to control materials. With lots of muscle, little or no skill, and with little use of tools he or she starts to work.

With training in school or on the job, or both, the learner gradually becomes skilled and uses more and more tools. He controls either more material, or does more accurate work, or both. He uses his mind more, his muscles less.

As a skilled worker he uses many tools, controls more material, quantitatively or qualitatively, and lots of mind. Then the skilled worker, if he has learned how to use mind tools or speculative tools, is ready to cross the line and become the boss.

Operative tools are used to control muscles and materials in solving problems or performing work jobs:

Work Jobs	*Operative Tools*
Cut off a board	Saw
Bore a hole	Bit and brace
Comb hair	Brush and comb
Tighten nut	Wrench
Write letter	Typewriter
Splice wire	Pliers

Speculative or mind tools to control minds in education and in employment to solve problems in production and in human relations:

Training workers	*S-K-R-A (Skill, knowledge, reason, attitude)*
To do any work job in any line	The 5 P's
To anticipate (prevent) or to remedy trouble	Tookey's formula
Selecting employees	Richard's formula
The three "fits" needed in life	Fitting into the job, into the shift and fitting into society
Training and learning	The six stimuli
Memory	The 4 R's of memory
Solving all of life's problems	Logical reasoning (4 and 10 steps)
How and why success requires you to look three ways	The three pronged fish spear

If you can't get the job you like, how can you like the job you've got?

Boulware's Nine Ingredients in All Pay Jobs — are you getting yours?	
Emotional adjustment	Happiness profile
Efficiency adjustment	Success profile
Selection and promotion	Profiles
Controlling people	The 3 E's (education, enforcement and engineering)
Labor disputes	The lazy Y
Increased production	The 18 motions, the productive versus the nonproductive motions and the three skills
Jobs and tools	Eight kinds of jobs and tools

Tool Kit for Foreman, Manager, or Instructor

In each specific trade or occupation there is a different tool kit of *operative tools* needed by the skilled worker. However, the foreman, manager, or instructor needs only one general *tool kit* of *speculative tools* since he controls only *minds*.

The work of the world is done by controlling one or more of the 3 *M's: muscles, materials, minds*.

The unskilled worker applies muscles direct to materials (lifts coal or sand, handles lumber or loads stones). The skilled worker applies muscles to materials through tools. He uses wrenches on nuts, combs on hair, or pliers on wire. For these jobs the skilled worker needs a tool kit of operative tools.

The foreman, manager, or instructor uses *speculative tools* to control the *minds* of workers who in turn use operative tools to do their respective jobs:

1. Unskilled worker — muscles control material.
2. Skilled worker — muscles use tools to control materials.
3. Foreman, manager, and instructor control minds of workers who in turn use operative tools to control material.

The skilled worker also uses his mind to control his own muscles, which in turn are applied to tools which control materials. Therefore, both groups, the skilled workers as well as foremen, managers, and instructors, need a *tool kit* containing *speculative tools*.

We will, therefore, call this *speculative tool kit* the *tool kit for related*, keeping in mind that operative tools control muscles and materials, and that speculative tools control minds.

Below are listed some of the outstanding speculative tools:

Speculative Tool No. 1

The 5 P's are: plan, procure, place, process, put away.

Speculative tool No. 1 is one of the most valuable tools, since it can be used on all work jobs anywhere, anytime, and by anybody.

Try it on any job from brushing your teeth, to sharpening a pencil or saw, grinding valves, or building a house.

Speculative Tool No. 2

Tookey's formula: symptoms, trouble, result, cause, remedy.

This speculative tool is used by the trouble man, serviceman, inspector, supervisor, physician, and in fact by all who control the 7 M's: men, machines, mate-

rials, money, morale, methods, and markets.

Speculative Tool No. 3

The ten steps in logical reasoning: (1) spot problem, (2) analyze problem, (3) list related facts, (4) secure available facts, (5) weigh and evaluate facts, (6) draw conclusion, (7) form plan, (8) make decision, (9) carry out, (10) check results.

These may be condensed into four steps: (1) spot and analyze problem, (2) secure facts, (3) make decision, (4) carry out and check.

This speculative tool again is one of those that is or may be used by everyone at all times whenever logical reasoning is desired.

In using this speculative tool be careful to: separate facts from opinions; reason logically — not emotionally or by "hit or miss"; recognize selfish factors; recognize causes — results.

Speculative Tool No. 4

Objectives in the field of education and training: the seven cardinal principles, the four vocational objectives, and the six industrial-arts objectives.

Both the shop and class instructor must know how to use this speculative tool to determine his objectives of courses, units, and lessons. He needs this "tool" to "keep on the beam."

General Education

The National Education Association some years ago, after an exhaustive study, developed what are called the seven cardinal principles:

1. Health — a sound mind in a strong and healthy body
2. Command of fundamental processes — ability to read, write, think, study, and act
3. Worthy home membership — a happy, unselfish, and democratic home life
4. Vocation — knowledge and skills needed to earn a living
5. Civic education — an informed citizenship dedicated to the common good
6. Worthy use of leisure time — use of free time for worthy activities and pleasures
7. Ethical character — high spiritual character that is to be trusted and admired

Vocational Education

The objectives of vocational education may be listed in various ways:

Skill — dexterity or effective motions to perform work jobs

Knowledge — job knowledge or trade knowledge needed to do the jobs

Reasoning — ability to reason to meet various problems in employment

Attitude — acceptable trade attitudes

Another approach is from the viewpoint of employment:

Get job.

Hold job.

Secure promotion.

In the field of industrial education Dr. Homer J. Smith suggests the following objectives:

1. To develop skill in the use of common tools
2. To afford industrial information and social intelligence
3. To foster appreciation of good material and workmanship
4. To further intelligent choices of life occupation
5. To inculcate worthy personal traits and attitudes
6. To provide a measure of specific occupational training

Speculative Tool No. 5

Organization involves: (1) determining objectives, (2) selecting procedures to arrive at those objectives.

This speculative tool functions when you *organize* a course, a trip, a night out, or a complete training program. To determine objectives see Tool No. 4.

Speculative Tool No. 6

Operation involves: (1) interpreting, (2) making up plan or procedure, (3) carrying out and checking.

This speculative tool is used by all *operators*. No matter how well the activity is *organized*, the *operator* will fall down on the operating job unless he observes and follows all *three operating steps*.

Speculative Tool No. 7

The three motives controlling all people: (1) self-interest, (2) self-pride, (3) job pride.

This *tool* is used in controlling the minds of people with whom you work. Increasing the pay check appeals to self-interest; a "pat on the back" appeals to self-pride, and "calling 'em down in private" allows for self-pride. The expert workman is motivated by job pride.

Speculative Tool No. 8

The three E's: (1) enforcement, (2) education, (3) engineering.

In traffic control we long ago learned that we can control people by traffic laws (make 'em do it), or by traffic education; or by engineering (traffic lights, double lanes, etc.). In all lines of employment we should consider this same "tool" (for "engineering" use "human engineering").

The wise operator keeps in mind that he has at hand all three of these "tools" to enable him to secure needed results.

Speculative Tool No. 9

The SKRA tool. SKRA means skill, knowledge, reason, attitude.

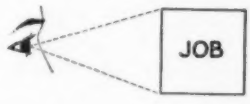
Skill: Correct manipulative process

Knowledge: Correct mental reaction (job knowledge)

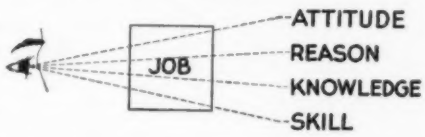
Reason: "Use" of knowledge to fit changing conditions and to meet requirements

Attitude: Appreciation of good workmanship, respect for authority, dependability, etc.

The SKRA tool is very important. Every workman and every student each day performs a *job*. It is highly necessary that the "eye" be focused on the job:



However, beyond the job both the workman and the student should "see" four important objectives as shown below:



Both the worker and the boss should always see the four goals or objectives through and beyond the actual work job. Especially in training people we must keep in mind that the work job or training job is only the "vehicle" to develop the big four: skill, knowledge, reasoning, and attitude.

Speculative Tool No. 10

Eighteen motions are used in industry:

Fingers, hands, wrists, elbows, shoulders (five on each side equals 10)

Ankles, knees, hips (three on each side equals 6)

Back, neck (2)

(See speculative tool No. 11.)

Skills result when the proper motions are used in the proper way. Productive motions are those motions that are effective and *increase the value of the product*. Nonproductive motions are ineffective and are called *energy leakers*.

The skilled worker avoids unnecessary motions; he does not use the back to lift; he places tools near by to avoid unproductive motions; he uses a vise instead of holding pieces in his hand. He uses wrist motions or finger motions as the job calls for.

Speculative Tool No. 11

The three kinds of skills: (1) holding skill, (2) moving skills, (3) *feeling* skills. These are applied in four ways: to tools, to machines, to materials, and to miscellaneous balancing, posture, climbing, etc. The learner needs to have his attention called to these various skills and their

applications to the many tools and jobs of his line. Only under careful guidance will the proper skills be acquired. *Unlearning* bad habits and bad skills is a serious handicap.

THE PREPARATION OF COPY FOR A SCHOOL PAPER

LEROY BREWINGTON

Department of Printing
Kansas State Teachers College
Pittsburg, Kans.

Almost every school of any size has a school paper of its own, either printed in its own department of printing or in a commercial print shop. In some of the smaller schools the city newspapers reserve certain sections or pages for the school news each week. Whatever the paper may be in which a school is represented, there is a correct method for the news to be written before it is handed to the printer. The following instructions in the preparation of copy have been used by schools for several years, and have proved adequate guides for young journalists in the preparation of manuscript for the printer.

1. Use the typewriter. See that type faces are kept clean.

2. Use double or triple space between lines to permit legible interlineation. Never type single-spaced copy.

3. Write your name in the upper left-hand corner of the first page. If the story is more than one page long, put a *guide line* and page number in the upper right-hand corner of each sheet, thus: Wreck 1, Wreck 2, Wreck 3, or Picnic 1, Picnic 2. The guide line should be a keyword that will remind one what the story is about. Do not use a guide line or "slug," that is likely to be duplicated during the week; if in doubt, ask at news desk.

4. Leave a margin of at least an inch at the left. Leave the top third of the first page blank for headlines. On succeeding pages leave at least an inch at the top.

5. Write on only one side of the paper.

6. Never write up or down in the margin. This makes hard work for the copy cutter and the printer.

7. Indent approximately five spaces on first line of paragraphs.

8. Never divide a word from one page to another or from line to line. Do not carry over the last few words of a paragraph to another page.

9. Use extreme care in writing names and figures. *Watch the spelling of names* and verify each one. When writing in longhand, print proper names and unusual words. Underscore u and a and overscore n and o. Ring each period or make a small cross to stand for it.

10. Copy sheets may be pinned together but do not paste them, or tear them at the corners.

11. Do not write two stories on the same page unless they are to be run under the same head.

12. To elide a word or letter, cross it out unmistakably.

13. When there is any chance that a word intentionally misspelled or written in an unusual manner will be changed by the printer, write "follow copy" in the margin.

14. A circle drawn around an abbreviation indicates the word is to be spelled out in print. A circle around a spell-out word indicates it is to be abbreviated.

15. An oblique line drawn downward from left to right through a letter makes it a small (lower case) letter. Do not obscure the letter — remember the printer must read it. Three lines under a letter or a word indicate that full capitals are desired. Two lines call for small capitals, one for italics, and a wavy one for bold face or black face type.

16. Read the story carefully before handing it in. Be constantly on guard against inaccuracy or libel. Call the attention of the editor to any point in the story that appears doubtful or dangerous.

17. Use an "end-mark" to indicate the story is completed. A cross made of parallel lines or "30" in a circle may be used.

18. Remember that the printer is neither a mindreader nor a handwriting expert. The names and facts with which the writer is familiar are to him only so many unrelated words to be put into type as he finds them. Every word, every letter, should therefore be plainly written. Every needed punctuation mark should be in place. The correction of errors in type is expensive and time-consuming. Save time and money for your office by care in writing and editing copy.

Problems and Projects

WALL PLAQUES

WILLIAM LEE HODGE

Palmer Elementary School
Springfield, Ill.

The plaques pictured here are but a few samples of the type of work which may be done with Upson and similar board and simple colors. This type of work is especially suited to the elementary grades and junior high school where the author has applied it with pleasing results. Student interest and motivation were high in almost all classes.

Designs and ideas for the first plaques came from children's coloring books which were bought at the ten cent stores. Later designs and drawings were student initiated and executed. Comic book characters evolved as the students became more proficient in cutting and coloring. Personal shields bearing the last name of the student and corresponding to the medieval coat-of-arms were also made of this material. Although most of the plaques were made solely of Upson board, some of the backgrounds were constructed of ⅛-in. masonite or ¼-in. plywood. When this was done, the masonite or plywood was either lacquered or varnished. The use of lacquer and varnish on colored Upson board was discouraged because in most cases this caused the colors used to pull or run.

The procedure followed in making a plaque is given below:

1. Find a suitable design. Do not have beginners try to cut figures which embody thin lines or narrow areas. They cannot do it. Use objects only that have bulk and large areas.

2. Trace the design on tracing paper or, better yet, directly on a mimeograph stencil.

3. After mimeographing enough designs for the number of pupils in the class, measure the object to determine the amount of Upson board or other material needed.

4. Cut the board to the size required and place the object upon it. By shifting and turning, it is possible to get all of the object on the board.

5. Thumb tack one side of object pattern to board with two tacks. This enables the pupil to lift the pattern and check for missing lines at any time in the tracing process.

6. Put carbon paper under the pattern and trace around pattern.

7. Check all lines which go to make up the object or design before removing tacks.

8. Cut out design using coping saw and F

Wall plaques

Wall plaques

board. The author has found *V* boards mounted on an upright board so that they can be held in a woodworking vise. The use of the *V* board in this manner also makes it adjustable to the height of the student.

9. Sand the edges of the thin board using No. 1 sandpaper.

10. Woodburn details in object.

11. Coloring may be done with kerosene and crayola (the kerosene somewhat dissolves the crayola and gives a flat paint effect) or use tempera colors. The author recommends crayola for beginners. The method used is to brush on a small amount of kerosene, apply crayola, and smudge the color with the finger or a clean cloth.

12. Cut a suitable background piece and color to suit object.

13. Glue design to background with model airplane glue. Place books or heavy objects on the plaque until glue dries. Ten to twenty minutes will suffice.

14. At this point a frame made of orange crate slats may be fabricated if desired. Finishing the frame pieces before they are glued to the plaque is a good procedure to follow.

15. A loop to hold the plaque on the wall can be made of string.

These cutout designs may also be used for decorating book ends, letter holders, and for making stand-up characters.

MAKE AND HEAT-TREAT COUNTERSINKS, ROUTERS, AND VEINING BITS

W. A. COLE
Fuquay Springs, N. C.

Have you ever made, in your own shop, your own small diameter machine cutter bits?

It can be done with very little equipment, experience, and expense. In fact, you can make them at a cost of only a few cents each.

The essential equipment for doing this job consists of a small engine lathe, an oxyacetylene torch or ordinary gasoline blowtorch, and an emery wheel.

Take a piece of drill rod or other fairly high carbon content steel (.8–1 per cent) and turn it to fit the router collet. Then turn the cutter end to the desired size. In the case of countersinks, turn them to the desired included angle on the end. Then remove the bit and prepare the blowtorch for heat-treating.

Preheat slightly the tongs or large pliers and grasp the bit by the shank in a vertical position, just touching a pale blue flame. Manipulate the bit so as to raise the temperature, slowly and as evenly as possible, to a dull cherry-red color (approximately 1475 degrees F.). Then quench quickly in oil. Water is not suitable, for gas bubbles from dissolved air form on the tool and result in soft spots. The oil should be of medium viscosity with a flash-point of 350 degrees F. or higher, and the container should be filled to a depth sufficient to accommodate the bit in a vertical position. After the bit is cool, it is extremely hard and brittle. Therefore it must be tempered or "drawn" to eliminate the brittle condition yet maintain sufficient toughness.

It is impossible to control perfectly the tempering process without a molten lead bath or controlled heat kiln. You can, however, by polishing the bit to brightness estimate the temperature by observing the color changes of the metal. You can remove the dark oxide scale by inserting and sanding the bit in a drill chuck or lathe chuck. Again hold the bit by the shank in a vertical position and observe closely while playing a soft blue flame on the polished bit. Watch closely for the colors that appear on the surface. The first color to appear is faint straw, which blends into a straw, then into a yellow-straw (approximately 460 degrees F.). At this point, again quench the bit in oil, to prevent further softening of the metal.

Next, grind a small, straight flute and cutting edge on the bit by using a thin, round-faced medium-grit emery wheel. Then grind a slight *relief* for the cutting edge by holding the bit evenly against the flat side of the

emery wheel and slowly revolve it. Hone the cutting edge to keenness with a small oil or slip-stone.

Now try the bit.

Some practice may be necessary to perfect the technique, but once it is achieved the process is simple.

By following this procedure, countersinks, router bits, and veining bits can be made quickly, economically, and easily, in your own workshop.

PORTABLE LECTERN

Edwin G. Schulz
Instructor of Cabinetmaking
Vocational School
Racine, Wis.

Persons who use the typewriter or lecture before a group will appreciate the utility of this easily made portable lectern or copyholder.

It is made with a ¼-in. plywood back, ⅝-in. softwood leg, and a ¼-in. wood dowel for easy folding, and ⅝ by ⅝ by 1¼-in. block fasteners assembled with f.h. screws. It can be finished natural, stained, or painted, and will make an ideal project which embodies many varied operations for students in cabinetmaking.

LEATHER CARVING

STAN L. SCHIRMACHER
Industrial Arts Instructor
High School
Cottonwood, Ariz.

Basic leather carving in the conventional western style is not difficult and does not take much equipment. It is rapidly becoming a popular and paying hobby. Here is a complete course in a "nutshell," putting you in the "know-how," ready to go to work!

Carving, or *stamping* as it is termed in the profession itself, involves no cutting away or removing of leather, but is so called only because of its appearance and because the lines are cut, while in *tooling* the lines are impressed with a tracer point.

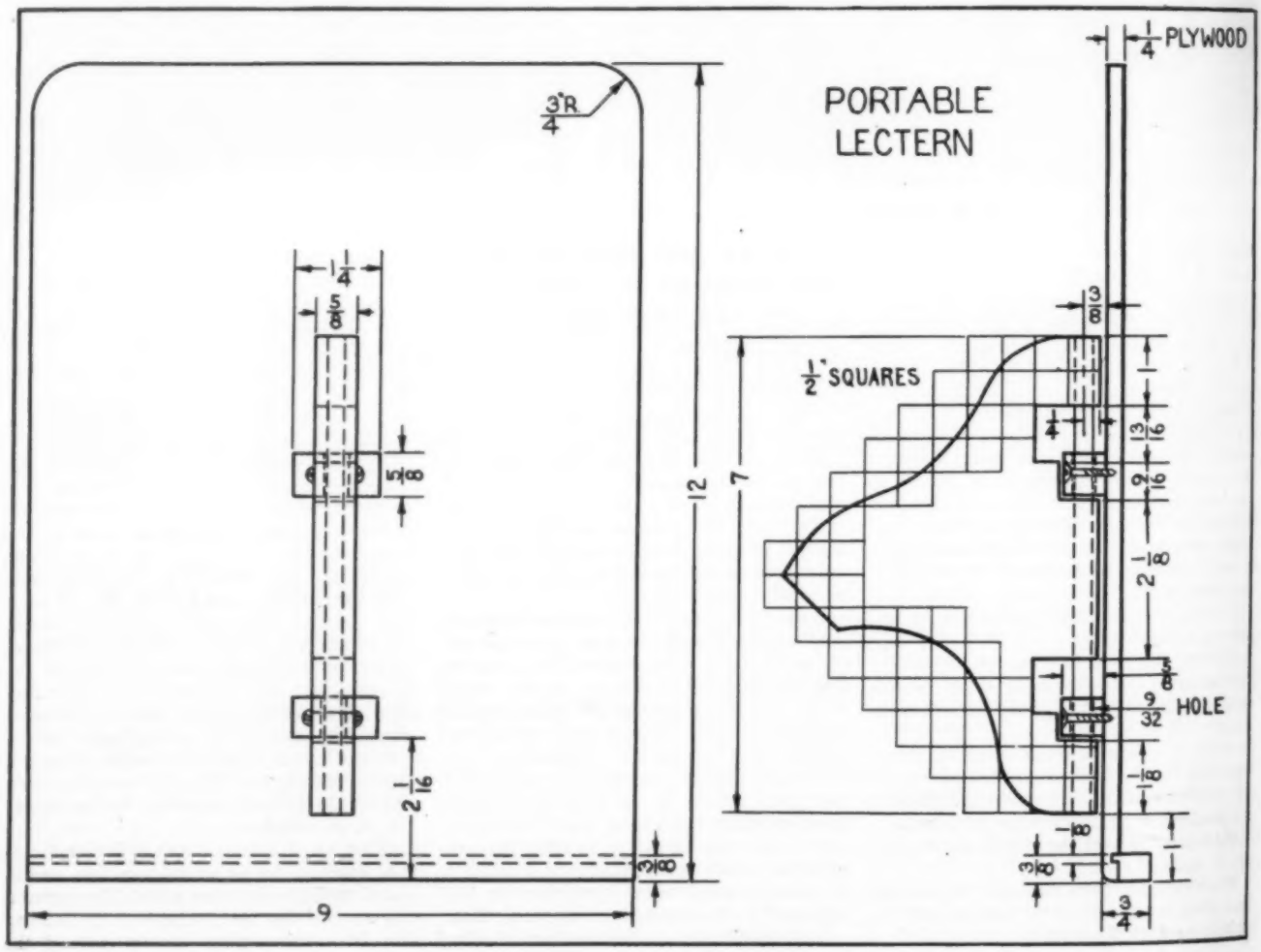
The basic tools necessary are: cutting knife, tracing pencil, swivel knife, and the following stamps: (*a*) beveler, (*b*) large ribbed pear, (*c*) small ribbed pear, (*d*) seeder, (*e*) mule foot, (*f*) camouflage, (*g*) veiner, and (*h*) bargrounder.

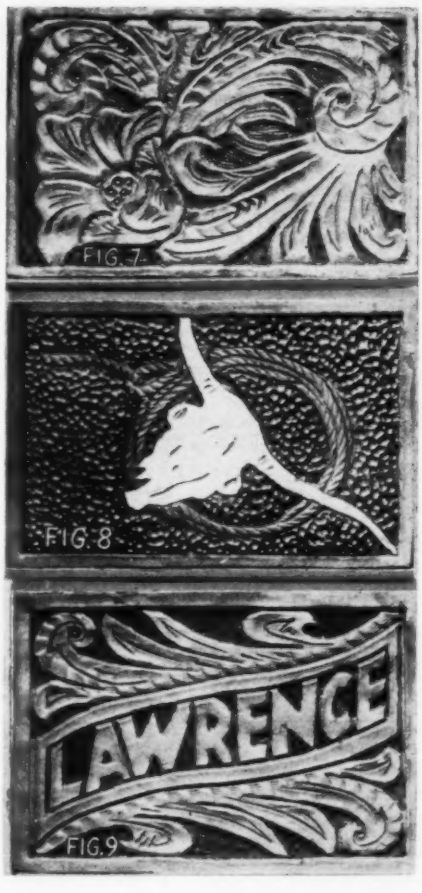
Cut Leather: The first requirement for cutting leather to the desired size is a sharp knife. Be sure to cut completely through the leather on the first stroke for a smooth edge.

Casing Leather: Tooling leather will not take or hold a good impression unless it has been made pliable by moistening. After the excessive moisture has evaporated and the surface of the leather has returned to its natural color the leather has been properly *cased* and is ready to work. If the project is too large to complete with one casing the leather may be recased, but repeated casings will stiffen the leather. Keep the moisture content *high* when carving, *medium* when stamping, and *low* when backgrounding.

Tracing Patterns: Figure 1. Place the paper design on the leather, and trace the lines with the tracing tool, holding it as you would a pencil. When designs are to be used to make numerous tracings place a thin sheet of plastic over the paper to prevent damaging it. Don't try to trace on soggy leather that is too wet. Handle the cased leather with care as all impressions remain.

Carving: Figure 2. Carving or incising is the process of cutting lines in or into the moist leather. The swivel knife is used, cutting to a depth of one third the thickness of the





leather. As the swivel top cutter is pulled along, the direction of the blade may be changed by rotating the cutter between the thumb and second finger. Use a straightedge to aid in cutting straight lines. If sharp or fine nonbeveled line cuts are needed, use a thin pointed knife blade. (See Fig. 8.)

Beveling: Figure 3. With the modeler or the designed deerfoot beveler stamp, push down the edges that need a beveled edge to make them stand out, such as leaves next to one another and inside edges of border lines where they touch designs. Do not bevel edges of backgrounding, *except* in preparation for ball point stippling, as in Figure 8.

Shading: Figure 4. Use "ribbed pears" to shade leaves, petals, spirals, etc.

Stamping: Figure 5. Use the various stamps necessary to the design, noting which stamps must be used first in case of overstamping.

Decorative Cuts: Figure 6. If leather is not moist enough dampen slightly and make decorative cuts with the swivel knife.

Stamps for tooling leather

Backgrounding: Figure 7. Use bargrounder on all background areas. This last process can wait a bit as the moisture content should be low.

Dye: Dye the background areas (as in Fig. 7) after the leather has dried completely, using a fine brush, and/or "antique" the leather.

Protective Finish: Use "tan treeing compound" on all surfaces (as in Fig. 7) to seal the leather from moisture.

Practice Projects: Various designs, similar to Figures 7 and 9, can be gotten from pattern sheets such as Ken Griffen's portfolio, or original patterns (Fig. 8) can be drawn up. An ideal project for practicework is blotter pads or mirror backs, and they make fine gifts. The ones illustrated were made 3 by 4½ in. and blotters cemented on the back.

DESK FILE BOX

EVERETT H. WEBSTER
Nichols Country Day School
Buffalo, N. Y.

The *In-and-Out* file shown in Figure 1, has proved to be both a practical and popular project for first and second form (seventh- and eighth-grade) boys.

This project serves as a good general shop project by combining woodworking and elementary printing, however the *In* and *Out* labels may be lettered or painted directly on the file box rather than setting them up in type.

Poplar was used for the ends, sides, and upright pieces. The bottoms were cut out of Masonite and slid into grooved side and end pieces.

The labels were printed on white index Bristol and fastened in position with rubber cement and escutcheon pins.

The product was sanded and finished with three coats of shellac. A coat of wax was then applied to complete the project.

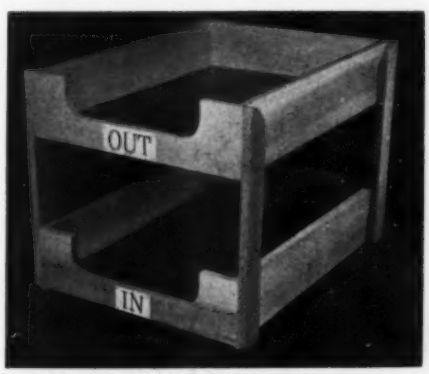


Fig. 1. Desk file box

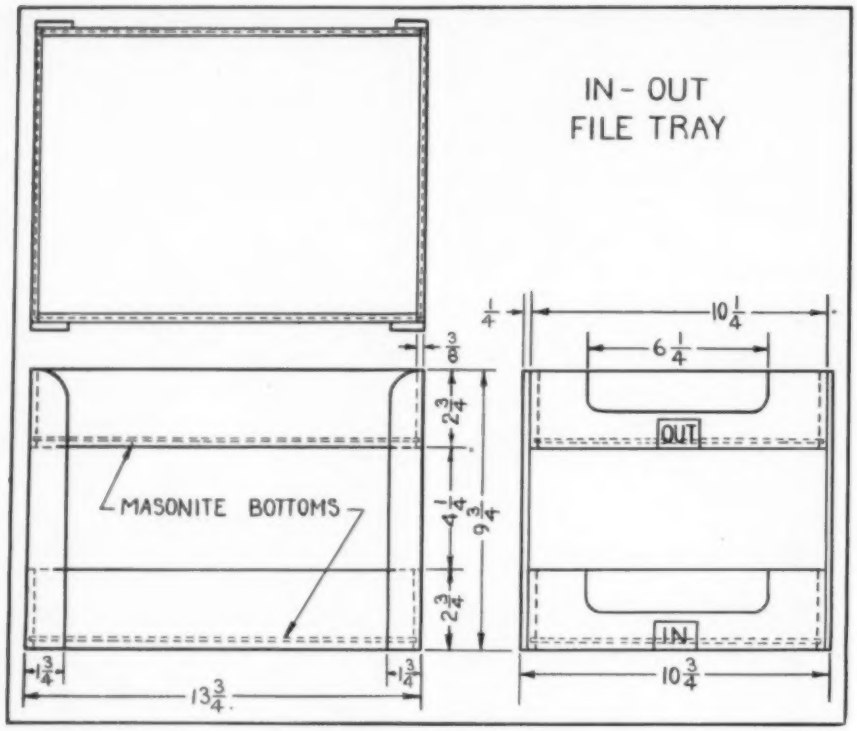


Fig. 2. Details of file tray

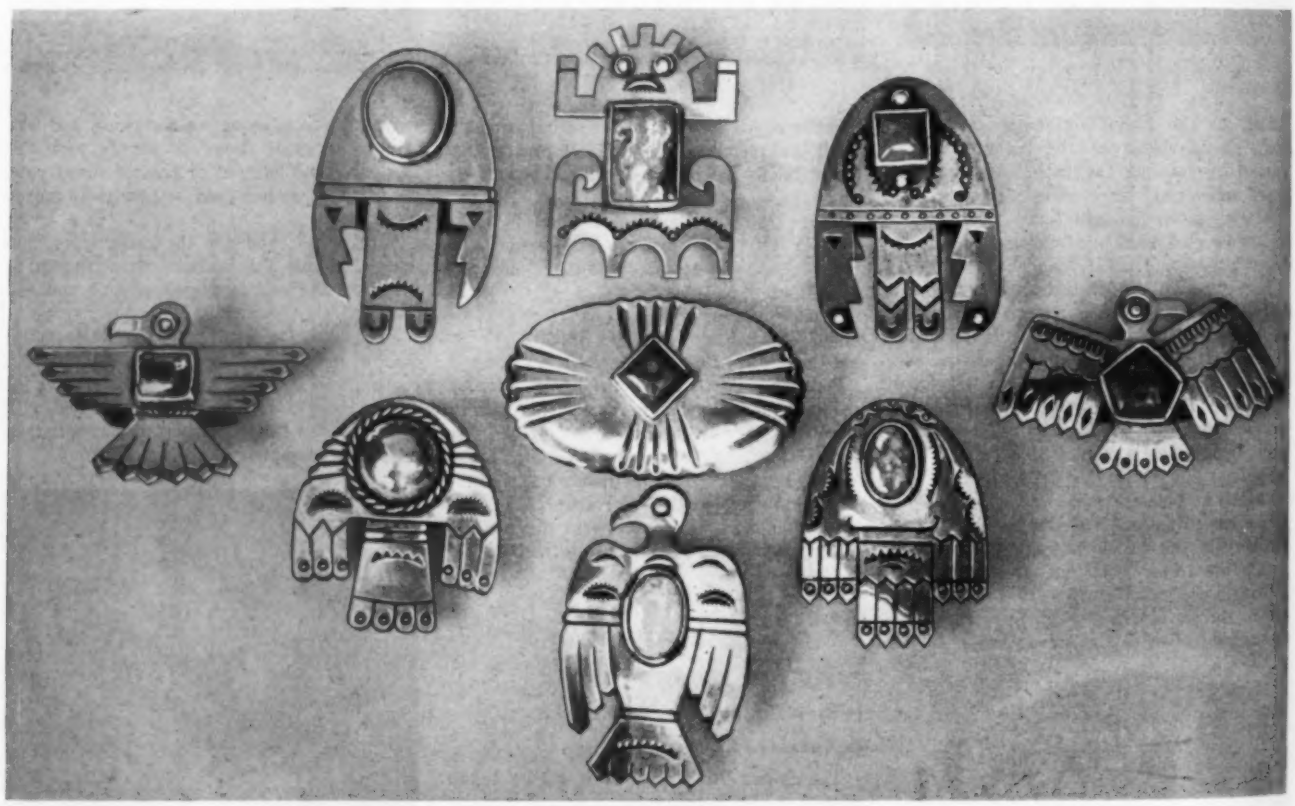
BILL OF MATERIALS

No. of pieces	*Name*	*Size*
4	side	3/8 x 2 3/4 x 13 in.
4	end	3/8 x 2 3/4 x 10 in.
2	bottom	1/4 x 10 5/8 x 13 3/8 in.
4	upright	3/8 x 1 3/4 x 9 3/4 in.

Method of Procedure

1. Select stock and cut out sides and ends.
2. Cut sides and ends to length.
3. Groove sides and ends.
4. Lay out and cut two end pieces to shape.
5. Cut bottom pieces.
6. Assemble two boxes.
7. Rip uprights to width, joint edges.
8. Cut uprights to length.
9. Lay out and cut four uprights to the shape shown.
10. Assemble two boxes with uprights.
11. Finish sanding the entire project and apply finish.
12. Print or letter *In* and *Out* labels.
13. Apply labels in their respective positions.
14. Wax project.

About 75 per cent of 1949's automobile accidents were caused by drivers of passenger cars. — *The Travelers,* Hartford, Conn.



Additional designs for silver neckerchief slides with an Indian motif

For an article on this subject see pages 384 and 385 in the November, 1949, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

Designed by Ben Hunt, Hales Corners, Wis.

A TEST THAT TEACHES

ALBERT KOSLOFF
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Waller High School
Chicago, Ill.

The test described in this article is the result of a method used to teach high school graphic-arts students to differentiate between colors and to recognize printed styles and sizes of type. It is an ideal visual and practical aid in teaching students to discriminate between difficult items. This teaching technique has the following advantages:

1. It aids in teaching related information.
2. The test gives a pupil a chance to work with parts or tools that are used in his regular schoolwork.
3. The student finds it interesting.
4. The test aids in differentiation.
5. There is a follow-up, since mistakes are explained to the learner as the test is being scored.
6. The test does not require expensive material and equipment.
7. It eliminates *catch* questions.
8. The pupil can administer the test to himself.
9. It is a test that is applicable to vocational, industrial arts, and academic subjects.
10. The test can be used for remedial work.
11. A key may be used for scoring.

The mechanical make-up of the test consists of two parts, a chart and an envelope or bag. The chart has squares drawn on it with a statement or word lettered in each square. The envelope or bag contains the items or parts that are lettered in the squares. The pupil must take the correct item or part from the envelope or bag and place it onto a given square as shown in the directions in Figures 1 and 2.

The charts may be made from window shade material, sign cloth, canvas, strong wrapping paper, or plywood. The statements, lines, and directions on the chart are drawn on with India ink. About two coats of very thin white shellac may be brushed over the inked lettering and lines to prevent their rubbing off. The envelope or bag which is to contain the parts may be made of a good, strong paper or cloth. Where parts are bulky, it is advisable to use a cloth bag. If test items can be put on paper or cardboard, then parts may be kept in an envelope. Tools, parts, or material covered in the regular course serve as items for the test.

Since this is really a matching test, the same good testing procedures must be followed in its construction as in any objective test. There should be enough squares on the chart to cover a specified and related phase of work. The squares or rectangles should all be the same size. That is, there must not be bigger squares with which bigger parts are to be matched, as this would tend to give away the answer. To reduce possibility of guessing and possibility of doing parts of the test by elimination, it is advisable to have five or ten more items or parts in the bag or envelope than there are squares in the accompanying chart. In matching an item with the statement in the square, each item should fit in only one square. It is wise to have the test complete on one chart. The directions for administration of test may be printed on a separate sheet or on the chart right above the squares. Directions should be specific and clear.

If possible, two forms should be made for each type of test. One form may be used for teaching or as a pretest and the other can be used as a test to find out retention or learning. However, a form may be administered over and over to a student just as a teaching technique.

Where quite a few students are to be administered a test at one time, it may be desirable to use a key for scoring. The key used is a reproduction of the test chart, except that the key has a number in each square in-

RECOGNITION OF PIPE FITTINGS

DIRECTIONS: There is a name of a pipe fitting lettered in each square in the chart below. You will find pipe fittings in the bag that accompanies the chart. You are to place the correct pipe fitting on the square that has the name of that fitting lettered in it. For example, the plain elbow pipe fitting is placed in the square marked "PLAIN ELBOW." There are more fittings in the bag than there are squares on the chart. As soon as you place one pipe fitting in each square, have the instructor check the work.

PLAIN ELBOW	PLAIN CROSS	COMMON COUPLING	BUSHING	PLAIN TEE
COMMON PLUG	45-DEGREE ELBOW	SLOTTED PLUG	CLOSE NIPPLE	CAP
HEX. SHOULDER NIPPLE	LATERAL	REDUCING BUSHING	ANGLE TEE OR Y-BRANCH	LONG TURN ELBOW
REDUCING ELBOW	LONG NIPPLE	ELBOW, MALE PIPE AND UNION	STREET ELBOW	45-DEGREE ELBOW, MALE PIPE AND UNION
CLOSE RETURN BEND	THREE-WAY ELBOW	REDUCING COUPLING	TEE TRIPLE UNION	OPEN RETURN BEND

Figure 1

RECOGNITION OF FASTENERS

DIRECTIONS: The chart below made up of squares is to help you learn to recognize different types of fasteners. There is a name of a fastener lettered in each square. You will find the fasteners in the bag that accompanies this chart. You are to place the correct fastener onto the square that has that fastener lettered in it. For example, the common wire nail is placed in the square lettered "COMMON WIRE NAIL." There are more parts in the bag than there are squares on the chart. As soon as you have placed one part in each square, have the instructor check the work.

COMMON WIRE NAIL	ESCUTCHEON PINS	BRAD	STAPLE	ROOFING NAIL
CORRUGATED FASTENER	FINISHING NAIL	LAG SCREW	CARRIAGE BOLT	FLAT-HEAD MACHINE SCREW
STOVE BOLT	SCREW EYE	ROUND-HEAD MACHINE SCREW	PLAIN NUT	LOCK WASHER
DRIVE-SCREW	FILLISTER-HEAD MACHINE SCREW	WING NUT	ROUND-HEAD WOOD SCREW	COTTER PIN
SOCKET-HEAD SET-SCREW	HEXAGON HEAD BOLT	SQUARE-HEAD SET-SCREW	PLAIN FLAT WASHER	PHILLIPS HEAD MACHINE SCREW

Figure 2

stead of a statement. The number in a given square of the key corresponds to the number on a part which is placed in the square of the test. In scoring the test with a key, the numbers on the parts or items in the squares of the test chart are checked against the numbers in the key. It is evident that the numbers in the squares of the key are not to be arranged in a consecutive or orderly fashion, for this may aid the student in answering an item that he does not know. The number on a part or item should not be conspicuous and should give no indication to the student in which square an item is to be placed. When taking the test, the student should be told to place the item in the square so that the number on the item can be seen easily. This will facilitate scoring.

Figures 1 and 2 show representative types of charts. The chart shown in Figure 1 is part of a test that was used to acquaint industrial-arts students with different types of fasteners. Figure 2 presents a test that could be used as an aid in learning types of pipe fittings before drawing some of the more common fittings in mechanical drawing.

ENAMELING COPPER

W. A. COLE

Fuquay Springs, N. C.

Copper enameling provides the homecrafter a fascinating and worth-while pastime. The process is simple, fast, and relatively inexpensive. It affords the amateur real creative expression in art, handicraft, and design.

The copper enameling process consists of placing colored powdered enamel on a specially prepared copper surface and subjecting the piece to a high temperature inside a kiln to produce a vitreous surface on the copper.

The essential equipment required consists of a small electric or gas kiln, a small hand spray, a variety of commerical enamels, and a little know-how.

Colorful and attractive copper ash trays, coasters, serving trays, and even jewelry may be made by this process. A variety of combination effects may also be produced by acid etching, saw piercing, and routing the copper before enameling it.

This article will explain how to do the simple overlay enameling of a coaster or ash tray.

First take a sheet of copper, 20 gauge or thicker, and cut a round disk to a suitable diameter. Raise the outside edge slightly by metal spinning, beating down, or in a wood die-press. Next, clean the copper thoroughly and remove the burred edges with a file. Then clean it with medium steel wool, after which immerse it for three to five minutes in a *bright dip*.* Next, dry the copper with a clean dry cloth. Then comes the flux preparation.

*The bright dip may be made as follows. Pour 1 part of commercial sulphuric acid into a crock and slowly add an equal part of nitric acid. When the mixture has cooled, add a teaspoon of common table salt to every gallon of the mixture. After the boiling has ceased it is ready to be used.

Because of the fumes the mixing of the acids should be done outside. Be very cautious when using this dip not to splash the dip on your person or clothing.

Fig. 1. Spraying prepared copper
Fig. 2. Shaking on dry enamel
Some finished articles shown in foreground

Mix about 2–4 per cent (dry-weight) of gum tragacanth (powdered organic substance) with water. Using a hand spray, spread a fine mist over the copper surface to be enameled. Then screen (if it is not already commercially done) the enamel through an 80-mesh screen and apply the enamel with an ordinary salt shaker in a medium-thick, even coat. Dry the gum tragacanth by placing the coaster near a large light bulb or on the kiln top. After it is completely dry, place the coaster on firing stilts in the kiln. The kiln should be preheated to a temperature of approximately 1500 degrees F. The coaster should remain in the kiln until the enamel surface becomes vitreous, usually about 2 minutes. Remove it, and allow it to cool.

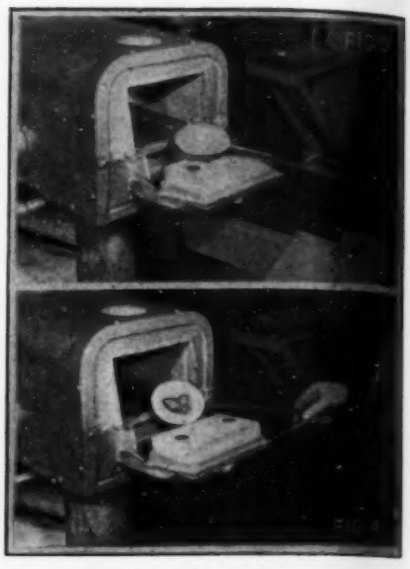

Fig. 3. Overclay firing
Fig. 4. Base glaze firing

You can produce an attractive overlay effect by repeating the process with a contrasting color after placing small leaves, fern, or pressed flowers flat-down over the first coat. The coaster is again dried, the leaves or ferns carefully removed, and then the whole refired. You can produce still another effect by mixing the colors into a small amount of mineral oil and applying them over the base glaze with a small art brush. The drying and firing process is repeated as before.

Enamels in a variety of colors are available, at little cost, at any art metal supply house and the gum tragacanth costs but a few cents at your neighborhood drugstore.

Do not be discouraged if your first attempts are not entirely successful. By practice and diligent effort, you can acquire the copper enameling skill. The simplicity and versatility of the process will afford you a host of colorful, useful, and pleasing effects.

HANDY HOLE CUTTERS

J. ALMON HEYLIGER

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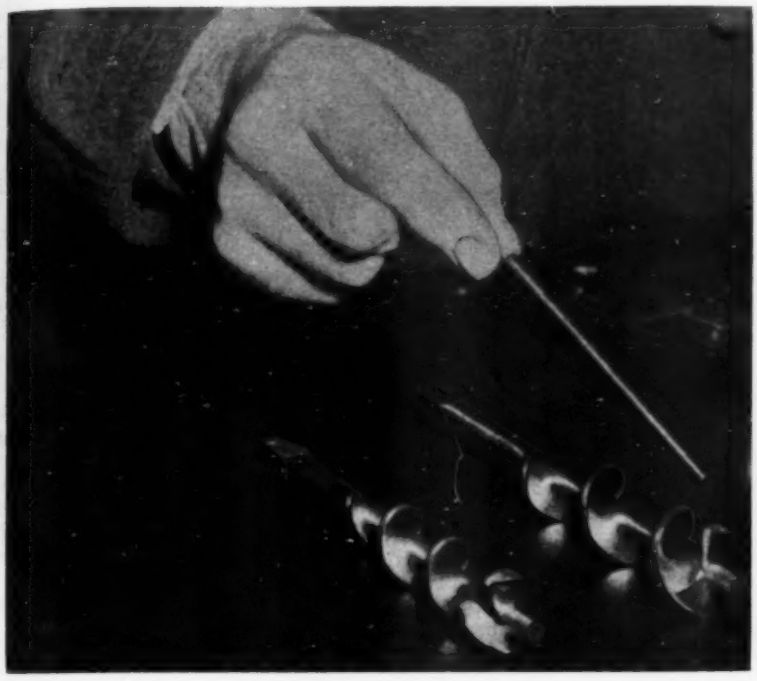
Public Schools
Concord, Mass.

The illustration, shown herewith, pictures two auger bits that have been converted to circular cutters for soft metal, fiber, and plastic boards, for radios and the like.

The cutters are ground back to the edge of the spurs, and a piece of brass or copper tubing is threaded on to the screw to act as a pilot.

The right hand bit has part of the spur ground off to give a ripping action for soft metal work.

The shanks may be removed if the augers are to be used in an electric drill.



Handy hole cutters

Maybe others might find this device as handy around the shop as I have for cutting socket holes in radio chassis.

LEARNING HOW TO DEVELOP FILM

H. A. GOLDSTEIN

Graphic Arts Department

Senior High School

Tucson, Ariz.

In this unit, intended for the beginner in photography, only the details for the production of printable negatives will be given. None of the refinements which the student will add to his equipment as he progresses are mentioned. Thus, the student will find that the steps outlined here have been reduced to the lowest point possible, and they require only such equipment as will be necessary to turn a roll of film into a roll of negatives.

The student should not expect the first roll of film he processes to be absolutely perfect. Perfection will depend largely upon how the amateur applies himself.

The first requisite in film developing is obviously a roll of exposed film. For the beginner, the ortho or chrome type of film is desirable. The trade names for this type of film are Verichrome (Eastman Kodak), and Plenechrome (Ansco).

An easy method of distinguishing the different types of film is to observe the safety paper wrappings around the film. If the color on the outside of the paper is red, you may be sure it is an orthochromatic film. If the paper is green, it is a panchromatic film. In developing, remember to use a red safelight when the wrapping is red, and a green safelight when a green wrapping is used.

Materials in Film Developing

Two clothespins of the spring type, or two spring-type metal clips made especially for film developing, should be obtained. In addition to three trays or soup plates and a thermometer, the student will require a darkroom lamp. This may be a ruby red incandescent bulb. A clock will be useful to check your developing, but is not absolutely necessary at this time. The solutions necessary to develop film are developer, short stop, and fixing bath.

The first step is to dissolve the chemicals in water strictly in accordance with the directions on the package. The beginner will fare as well with a tube or package or M-Q (Metol-Quinol) developer as with any other product. The cost for a tube is about five cents. In addition, the amateur will need a fixing bath (hypo). This also costs only a few cents. Four to five ounces of acid hypo fixing bath will adequately fix one roll of film before exhausting itself. Throw this bath away after using once, as it will be exhausted. The developer bath need not be thrown away after use. The instructions on the tube of developer will disclose how many rolls of film can be processed with a single tube of developer. The developing solution should be stored in a dark colored bottle. Write your name on a label and the word "film developer" if you wish to store your bottle in the film room.

The developer and acid fixing bath should be mixed and allowed to cool to room temperature before using. Do not let anyone lead you into believing that this temperature factor is not important. As you progress you will learn more about temperatures, but for the beginner, strict observance of the instructions given here will be required.

White Light Out – Safelight On

Put out all lights except the red lamp. Open the roll of exposed film and clip the end of the film to the clip. Let the loose end with the clip hang down, and continue to unroll the film until you come to the end. Free the second end of the film from the paper backing, and attach the second clip.

Fig. 1. Arrangment of trays and preparation of solutions

The photographs for this article were made by the Misses Pat Cooke and Mary Frances Dunn, first-year students of the Tucson Senior High School photography department

Arrangement of Trays

Holding a clip in each hand, move the film from end to end through the water which is contained in the middle tray. Note that the film has a natural curl, both from end to end and across. Hold the film so that both curls are upward or toward you. The purpose of this is to soften the emulsion and eliminate the possibilities of air bubbles and streaks in developing. It also makes the film pliable and easy to handle. A half dozen movements through the water will be sufficient.

The Developer

Now the film is run through the developer. The student will observe that the film soon begins to darken, and that the borders surrounding the photograph stand out sharply. If the film is held up to the safelight, the amateur will observe that an image is forming on each film frame. If the amateur will examine the reverse side of the film by reflected red light (that is, merely turn the film over in the developing tray), he will note that some parts of the film are much lighter than others and the image can be made out on the reverse side. He will soon learn by experience how to judge the extent of the development; but frequent examination, about every 15 seconds, will enable one to observe what takes place.

Be sure that the film is not held in one position for too long, otherwise development will be uneven. Many experienced photographers lift the film out of the developer completely and glance at the back. Do not stop development at this point, but continue to run the film back and forth through the developer until those light images which were first formed disappear, and you get more or less of an even "grayness" with the images scarcely discernable when the back of the film is examined while the red light falls upon it. If the film is

Fig. 2. Lights out. Attach a clip to one end of the roll of film, unroll the film, attach a clip to the other end. First, put the film through the water bath (in the middle tray), and then into the developer

held up to the light and looked through, the negative will be found crisp and sharp.

The Water Short Stop

At this point the film is lifted from the developer, allowed to drain for a moment, and then run through the water bath six times to remove most of the developing solution.

The Fixing Bath

Now transfer the film to the fixing bath in the third tray, and run it through the hypo until the film is completely clear. The borders of the film should be as transparent as a sheet of glass. Depending upon the strength of the hypo, this operation will take about 5 minutes. You can turn on the white light after the film has been in the hypo for 5 minutes.

Washing the Film

Many methods for washing the film will suggest themselves to the student. Some workers spread the film by clipping it to the sides of a dishpan. The water does not have to hit the film or run fast. Remember, in washing the film there is a chemical reaction between the hypo and the silver loose in the film and the water. Some people think a fast stream of water will do a faster job. This is untrue. The amateur must always remember that the inside of the film (the side toward which it curls) contains the sensitive emulsion. This portion must not be scraped or fingered. The back of the film, however, will tolerate reasonable handling.

After the film has been washed for about 20 minutes, it is removed from the water and hung up to dry. A clip is attached to the bottom of the film, and at the top the clip is attached first to a suitable support and then to the film. Make sure the film is hung so that it will not strike the wall or any objects. Rather than take a chance with scratching the film with a wet sponge or chamois, most beginners will be content to shake off as much water as possible before hanging up the film.

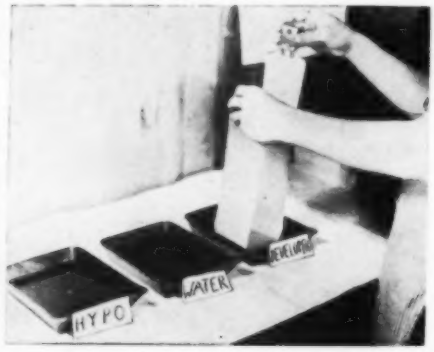


Fig. 3. Run the film through the developer until the images can be scarcely seen when viewed from the back of the film

Later, as you become more adept at developing, you may clock your operations, using the time and temperature method. Naturally, you will go in for refinements to perfect your technique. However, as stated in the beginning of this unit, here we are concerned only with the most essential operations in developing a roll of film.

Experiment 1
Developing Orthochromatic Roll Film

Objective: The purpose of this experiment is to develop a roll of orthochromatic film, emphasizing only the most essential aspects of film developing.

Materials:

1. A roll of exposed orthochromatic film, or a sheet of orthochromatic cut film.
2. Ruby red safelight
3. Three trays
4. One tube M.Q. developer
5. Four ounces of fixing bath (F5)
6. Two clips

Procedure: You have watched the instructor develop a roll of film, and if you have read your references you should have little difficulty in developing your film.

Develop your film, and have the instructor grade your work.

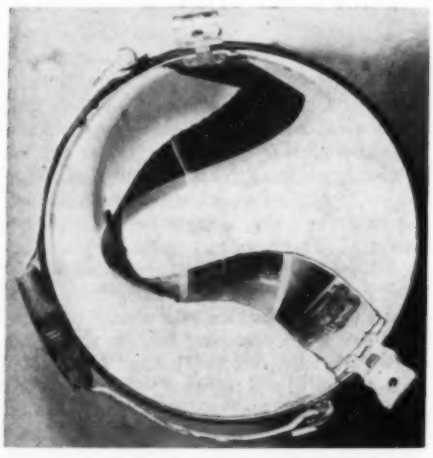


Fig. 4. Wash the film for about 20 minutes in slowly running water, or put it through six changes of water spaced over the same period of time

Test: Fundamentals of Film Developing

Objective: To determine if you have learned the fundamentals of film developing.

Materials: 8½ x 11 notebook paper, and pencil or pen.

Procedure: Answer the following questions. If you have any difficulty, refer to your reading references.

Questions:

1. Why is the film put through a water bath before it is put through the developing bath?
2. Orthochromatic film can be handled under what kind of safelight?
3. Why is film developed?
4. What happens when film is developed?
5. How is film development controlled?
6. What happens when the development is lengthened?
7. What happens when the development time is shortened?
8. What is the effect of agitation on film development?
9. What is the effect of temperature on development?
10. What is fixing the film?
11. How soon is it safe to look at negatives after they have been put into the fixing bath?
12. Why is slow-running water necessary when washing film?
13. How long should film be washed?
14. What is the recommended temperature in developing film?
15. How can you determine which side of the film contains the image?

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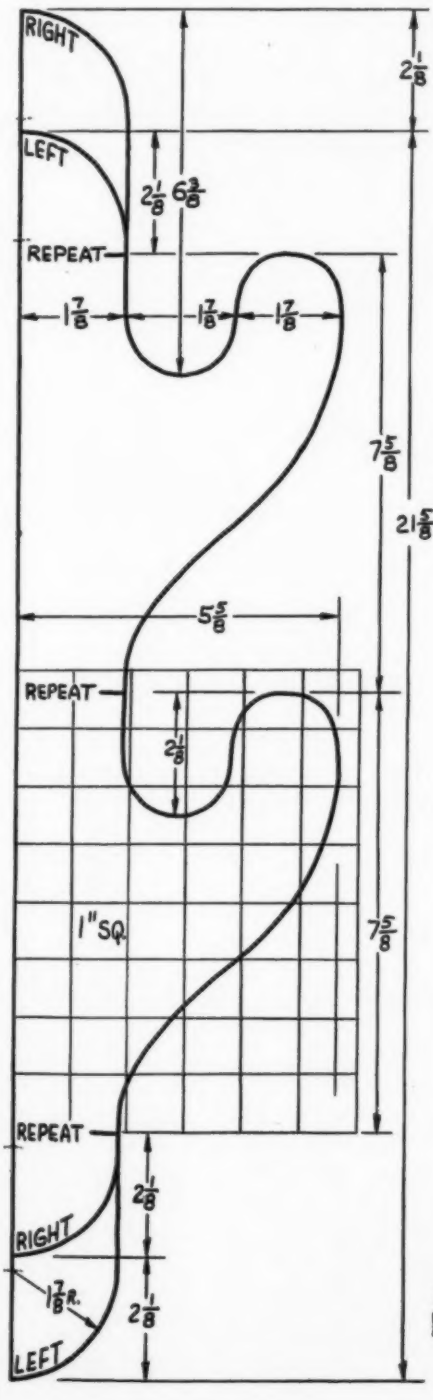
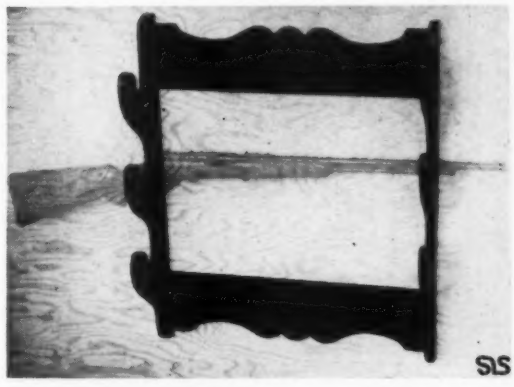
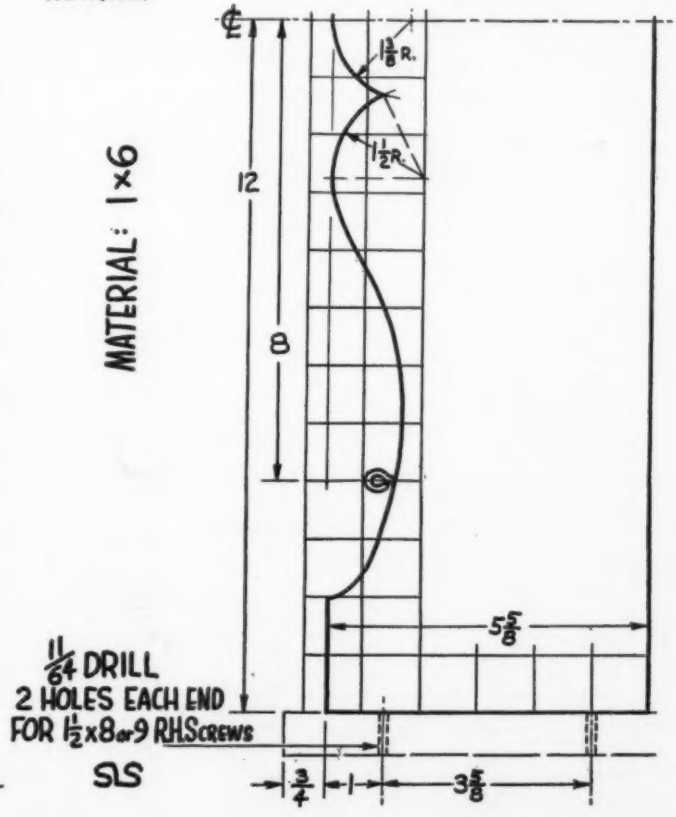
You are more than seven times as likely to be injured in an automobile accident between five and six in the evening as you are between six and seven in the morning. — *The Travelers*, Hartford, Conn.

HUNTER'S WALL RACK



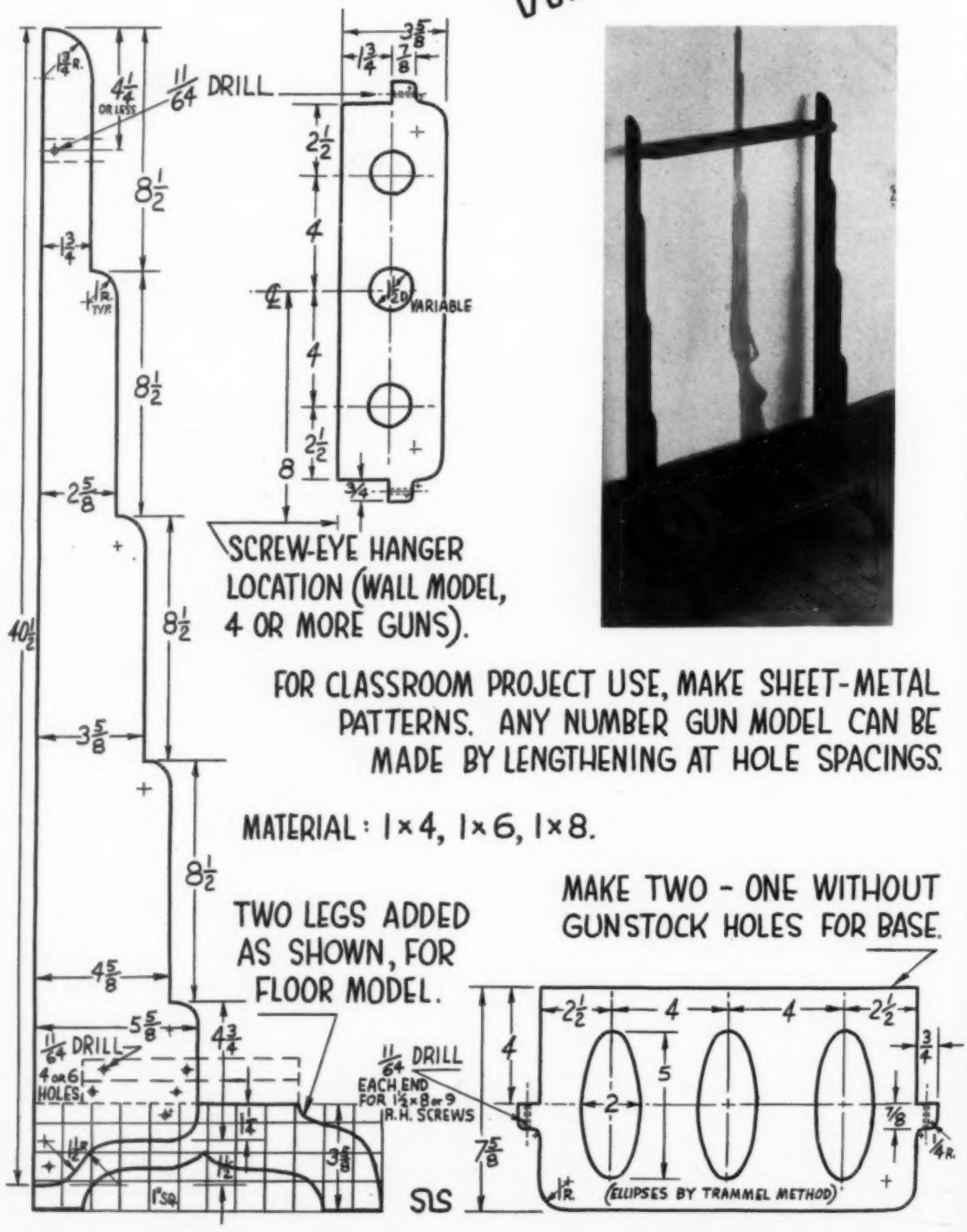


FOR CLASSROOM PROJECT USE, MAKE SHEET-METAL PATTERNS. ANY NUMBER GUN MODEL CAN BE MADE BY LENGTHENING AT "REPEAT" MARKS.



Wall gun rack submitted by Stan L. Schirmacher, Cottonwood, Ariz.

HUNTER'S FLOOR OR WALL RACK


SCREW-EYE HANGER LOCATION (WALL MODEL, 4 OR MORE GUNS).
FOR CLASSROOM PROJECT USE, MAKE SHEET-METAL PATTERNS. ANY NUMBER GUN MODEL CAN BE MADE BY LENGTHENING AT HOLE SPACINGS.
MATERIAL: 1×4, 1×6, 1×8.
TWO LEGS ADDED AS SHOWN, FOR FLOOR MODEL.
MAKE TWO - ONE WITHOUT GUNSTOCK HOLES FOR BASE.
11/64 DRILL
4 OR 6 HOLES
EACH END FOR 1½×8 OR 9 R.H. SCREWS
VARIABLE
(ELLIPSES BY TRAMMEL METHOD)
SLS

Floor or wall gun rack submitted by Stan L. Schirmacher, Cottonwood, Ariz.

FIXTURE FOR GRINDING MILLING CUTTERS

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Racine, Wis.

The time element in grinding milling cutters can be greatly reduced by the use of this grinding fixture. Simplicity of the setup and the ease of the grinding operation will readily be appreciated. The grinding fixture is practical, as well as safe. In fact, the fixture has a very definite safety feature. No longer does the operator hold the cutter while maintaining pressure on the tooth rest, instead, the operator holds the knurled nut. The numerous spacers are used to adapt the fixture to different width cutters. The fixture is mounted between centers on a tool and cutter grinder; the tooth rest may be mounted on the wheel head or table. The cutter is then traversed on the mandrel.

The machining of the grinding fixture will enable the student to receive valuable training in numerous operations.

Suggested Procedure

Spacing collars No. 1–2–3–4

Turn, drill, ream, chamfer, and cut to length.

Lock Nut No. 5

Turn, drill, thread, knurl, chamfer, and cut to length.

Bushing No. 6

Rough turn, finish turn thread diameter, thread, drill, bore, ream, harden, grind O.D., and lap hole if necessary.

Mandrel No. 7

Length optional, center drill, rough turn, harden, and grind O.D.

THE FM DISCRIMINATOR

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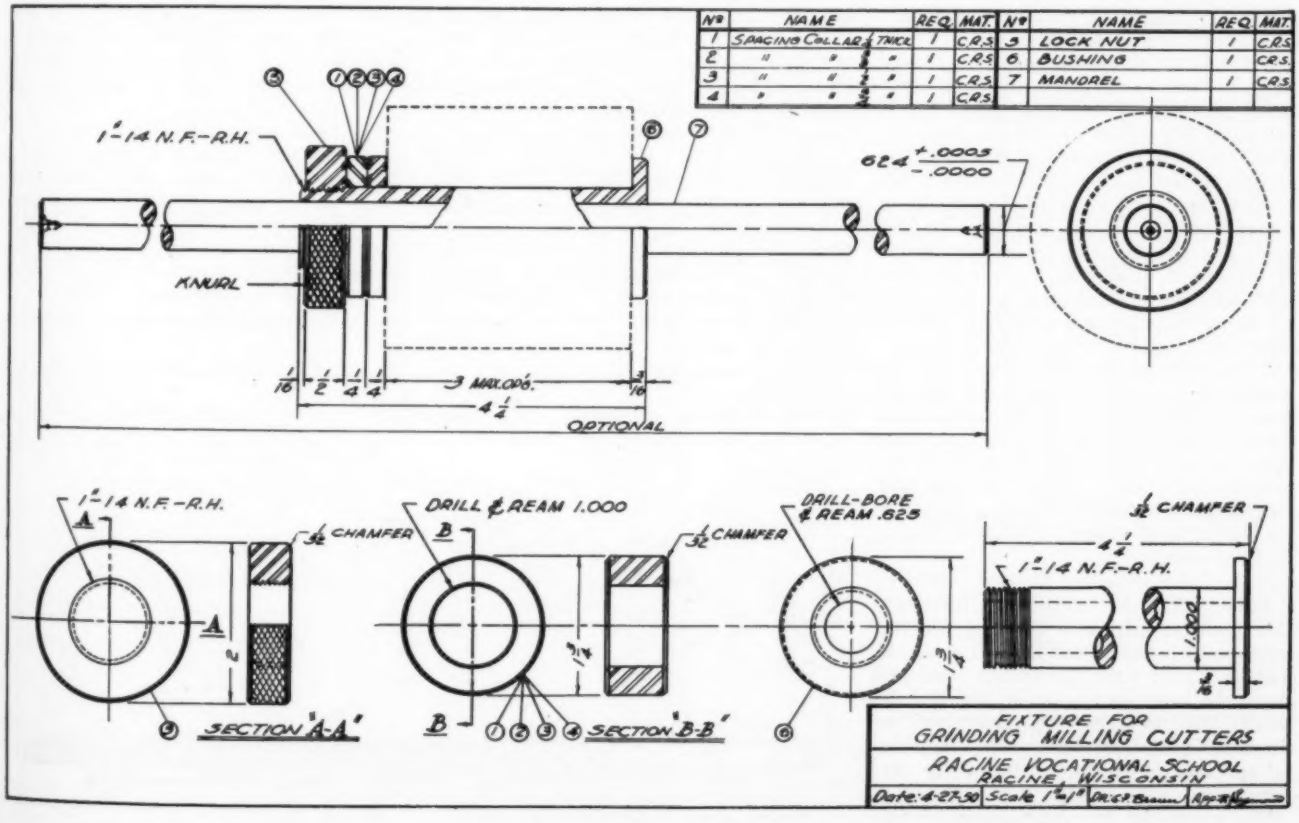
The understanding of the operation of the discriminator, or detector, hinges upon a knowledge of the operation of a basic diode detector circuit and a simple understanding of the relationship of out of phase voltages. The discriminator is the only circuit in a frequency modulated receiver that radically differs from equivalent circuits in an amplitude modulated receiver. The purpose of the visual aid described in this article is to simplify the explanation and understanding of the theory and manner of adjustment of this type of circuit.

As can be seen from Figure 1, the discriminator circuit consists of two diodes with their cathodes connected to individual load resistances. The plates of the diode are connected to opposite ends of the center-tapped secondary of the discriminator input transformer. The manner of connection results in signal voltages across each half of the center-tapped secondary which are equal and 180 degrees out of phase. The voltages thus developed are the input voltages to each tube and are shown on the diagram as E_2 and E_3. It is also apparent that the voltage that appears at the output of the discriminator will be the difference between the voltages across the series-opposing connected load resistances.

If the circuit described up to this point were used, the two voltages E_2 and E_3, which are always equal and opposite, will result in rectified voltages across the load resistances which are equal and opposite in polarity. The above can be shown visually by changing the frequency adjustment of Figure 1 and noting that while the vectors E_2 and E_3 rotate around a point, the resultant is always zero.

In order to overcome the previously described condition, another voltage, E_1, is introduced. E_1 is in the common return of both diode tubes and is therefore in series with the signal voltages E_2 and E_3. The series condition will effect the resultant voltages across the load resistances. It is to be noted that the radio frequency choke, across which E_1 appears, is effectively in parallel with the primary of the discriminator transformer. Therefore E_1 is the same voltage that is present across the primary.

There are now three voltages with which the actual operation of the discriminator may be illustrated. When the frequency pointer is placed at 10.7 mc. (the intermediate or center



Fixture for grinding milling cutters

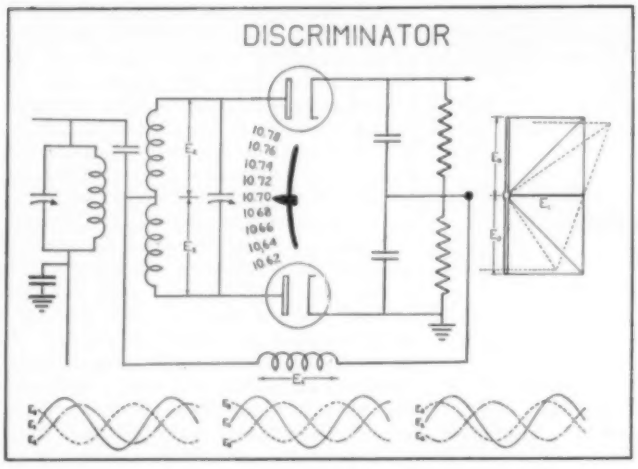


Fig. 1

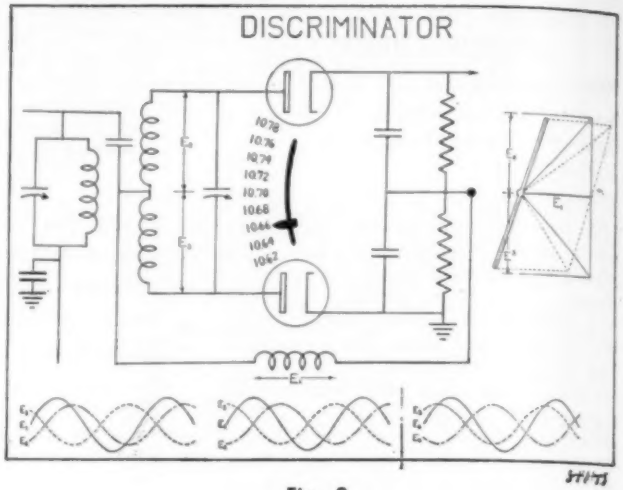


Fig. 2

frequency), the curves at the lower center of Figure 1 and the vector diagram at the right portray the conditions that exist between these voltages. The curves at the bottom show that each of these voltages differs from the reference voltage E_1 by ninety degrees. The same condition appears at the right of Figure 1 in the form of vectors. When the resulting parallelogram of forces is studied, it is apparent that the voltage across the upper diode load resistance is equal to that across the lower resistor. Since the two resistances are differentially connected, the output when only the carrier is present will be zero.

When the input frequency shifts to a lower value, as would occur with a frequency modulated signal, the curves at the lower left and the vector diagram at the right of Figure 2 show the new conditions that exist. The voltages E_2 and E_3 are still 180 degrees out of phase, but it can be noted that they have shifted to the left along the time line and that E_2 is now less than 90 degrees out of phase with E_1 and that E_3 is more than 90 degrees out of phase with E_1. The existing conditions again appear at the right of Figure 2 in the form of a vector diagram. The parallelogram of forces shows that the voltage developed across the upper load resistance is greater than that developed across the lower load resistance. The resultant voltage across the output will then be the difference between the voltages across the two load resistors. The voltage at the output will have the polarity of the larger of the two voltages, in this case positive.

At the instant that the frequency shifts to a higher point than the center frequency, like conditions exist with the exception that the signal voltages E_2 and E_3 shift along the time line to the right. The voltage developed across the lower load resistance will then be greater than that across the upper load resistance. Under these conditions, a negative voltage appears at the output of the discriminator.

The reason for the displacement of secondary voltages E_2 and E_3 with respect to E_1 is as follows. The secondary of the discriminator transformer is resonant at the intermediate or center frequency. When this frequency is present, the secondary is resistive in nature and the current and voltage are in phase. The signal voltages E_2 and E_3 are each displaced from the reference voltage by 90 degrees.

When the incoming frequency shifts to a lower value, the capacitive reactance of the secondary predominates with the result that the secondary current leads the induced voltage. Since the signal voltages are a function of the current flowing in the secondary, they will shift in phase with respect to the reference voltage as shown in the curves of Figure 1. When the frequency rises above the center frequency, the inductive reactance predominates with the result that the current lags the secondary voltage. The signal voltages E_2 and E_3, as set up by the secondary current, will then shift in the opposite direction along the time line. A change of frequency to the secondary results in either a leading or lagging secondary current. There is then an accompanying change in the phase displacement of the secondary voltages E_2 and E_3 with respect to the primary reference voltage E_1.

The adjustment of the discriminator may now be easily understood. An amplitude modulated signal generator is adjusted to the intermediate frequency with unmodulated output, and connected to the grid of the preceding tube. A direct current vacuum tube voltmeter is connected across one of the load resistances and the primary of the discriminator transformer is adjusted for maximum output. The vacuum tube voltmeter is then connected across both load resistances and the secondary of the transformer is adjusted for zero output since with no modulation the output should be zero.

The visual aid is simple and easy to construct. Figure 1 shows a basic Foster-Seeley circuit drawn on poster board with India ink. Figure 3 gives the detail of the lever mechanism used to rotate the vertical vector about a point on the horizontal axis when the frequency pointer is moved. The scale along the arc on which the frequency pointer moves has 10.7 megacycles at the center point with

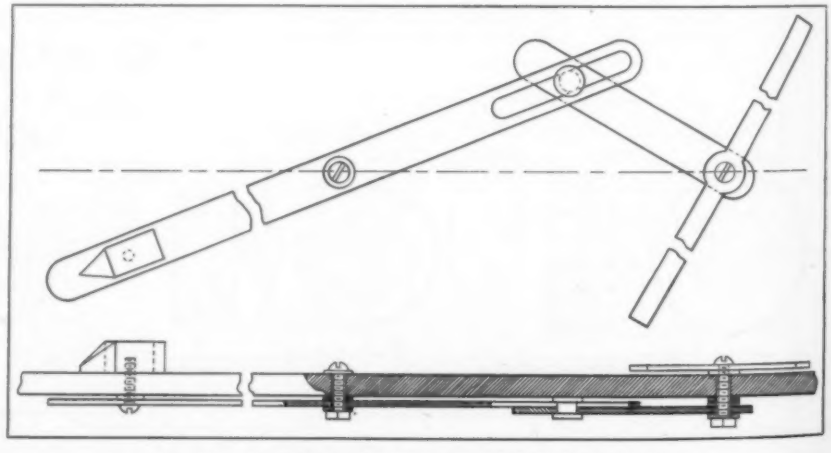


Fig. 3. Teaching aid for use with FM discriminator

equal frequency deviations being marked above and below the center frequency. The discriminator demonstrator is 22 by 30 in. with the entire unit being enclosed in a wood frame.

TRAMMEL POINTS

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The trammel points as described in this article is simple in design, yet involves many basic principles and practices of the machinists' trade. It will be an addition to any tool kit.

Suggested Procedure

Trammel Points No. 2–7

1. Turn
2. Taper Turn
3. Chamfer
4. Drill
5. Tap
6. Lay out
7. Drill
8. Heat-treat
9. Grind

Adjustment Unit No. 5

1. Turn
2. Chamfer
3. Drill
4. Tap
5. Form end
6. Lay out
7. Drill
8. Mill

Adjustment Screw No. 6

1. Turn
2. Thread
3. Form end
4. Cut to length

Adjustment Nut No. 4

1. Turn
2. Drill
3. Tap
4. Knurl
5. Cut to length

Set Screws No. 1–8

1. Turn
2. Form
3. Knurl
4. Thread
5. Cut to Length

Beam No. 3

1. Polish
2. Form ends
3. Mill

Assemble

TABLE LAMPS

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Bureau of Public Schools

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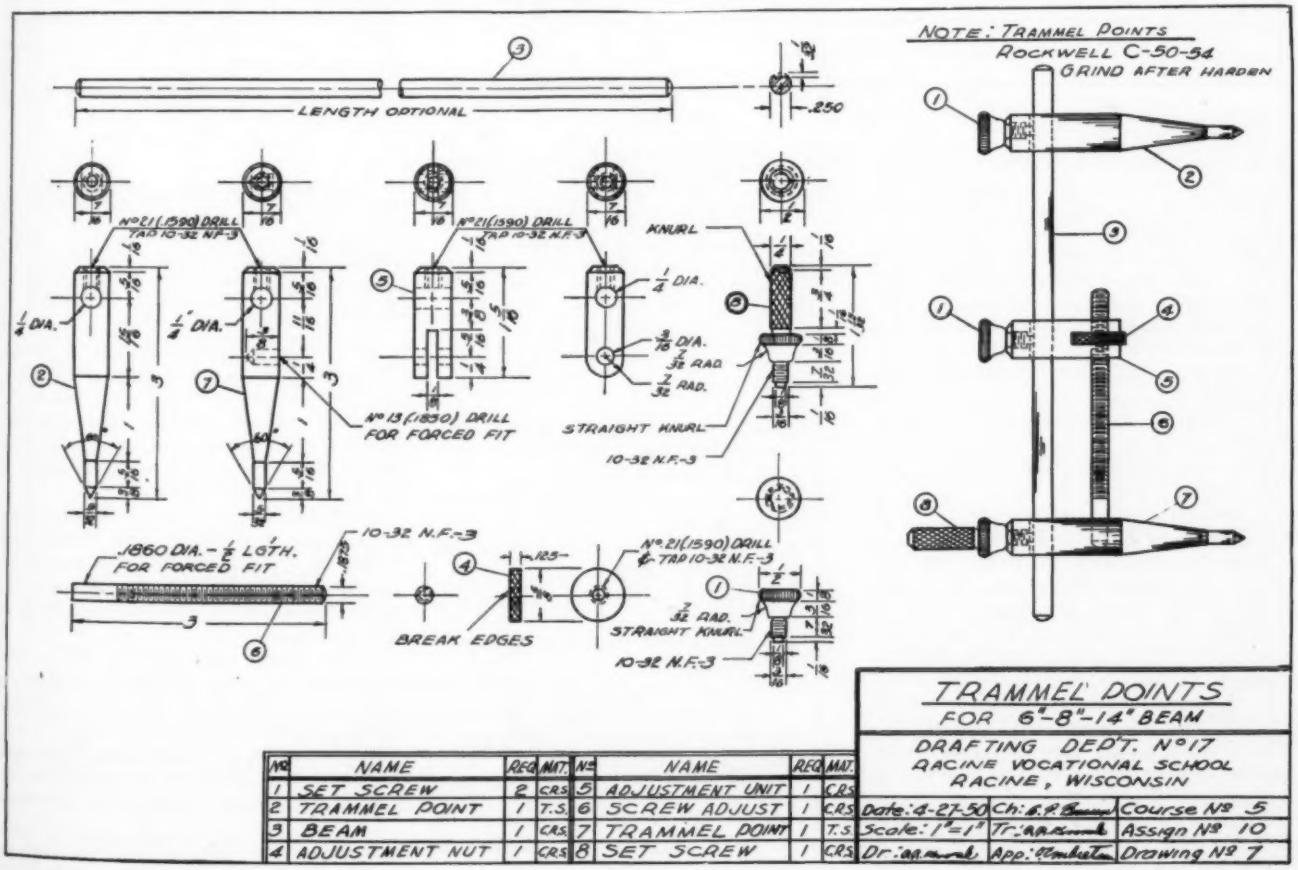
The table lamps in the accompanying working drawings are interesting projects for students and amateur craftsmen who have already learned the fundamental operations in wood turning. The projects are simple, yet it is believed that they would be a good means of stimulating and developing the student's imagination, creative ability, and ingenuity, as well as his manual skills.

Table lamp

The designs are merely suggestive. They may be modified to suit individual tastes and needs. Before starting to make the project, it would be a good practice for the student to



No	NAME	REQ	MAT.	No	NAME	REQ	MAT.
1	SET SCREW	2	CRS	5	ADJUSTMENT UNIT	1	CRS
2	TRAMMEL POINT	1	T.S.	6	SCREW ADJUST	1	CRS
3	BEAM	1	CRS	7	TRAMMEL POINT	1	T.S.
4	ADJUSTMENT NUT	1	CRS	8	SET SCREW	1	CRS

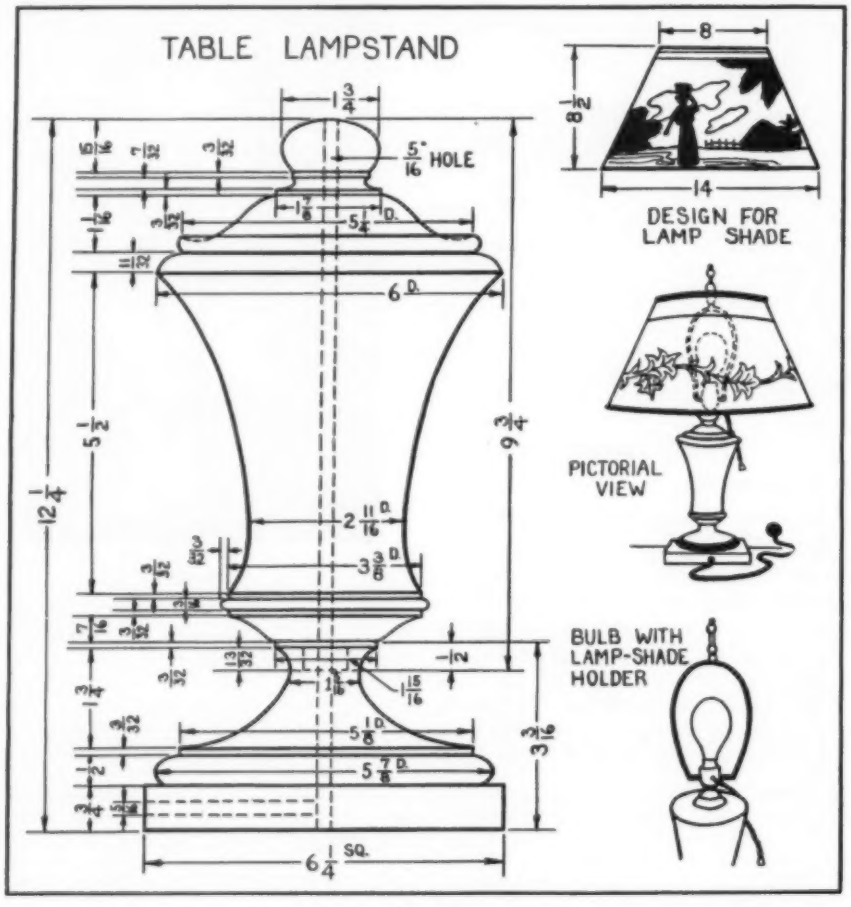


Plate 1

draw the turning detail to full size. In this way, the detail of the design and its general proportion may be more readily checked.

If the Philippine hardwoods listed below could be secured in the local market, it is believed that the workman would be very much delighted in using them because they do not only possess beautiful grains, but also lend themselves easily to turning:

1. Narra — Philippine mahogany (Pterocarpus inducus)
2. Camagon — Philippine ebony (Diospyros discolor)
3. Lanete (Wrightia laniti)
4. Molave (Vitex parviflora)
5. Dao (Dracontomelum dao)
6. Tindalo (Pahudia rhomboidea)

However, any American woods with fine grains, such as maple, walnut, and other hardwoods may be used to advantage.

In the project illustrated in Plate 2, the upper part of the upright may be made of *camagon* (Philippine ebony) and the lower part of *lanete* (Wrightia laniti), while the base may be made of *molave* (Vitex parviflora). This combination has been tried with success and the resulting article found to be beautiful.

I. *Tools and Equipment*

Handsaw, try square, dividers, tablesaw, fold rule, plane, screw driver, hand drill, twist drills, bandsaw, drill press, calipers, turning tools, lathe, pencil brushes, pliers, soldering iron, shears, files, and torch.

II. *Materials:*

1. *Lumber* (Refer to Plate 2.)
   - 1 pc. 4 x 4 x 6½″ (Philippine ebony)
   - 1 pc. 2 x 2 x 7″ (Lanete)
   - 1 pc. 2 x 7 x 7″ (Molave)
2. *Lumber* (Refer to Plate 1.)
   - 1 pc. 7 x 7 x 11″
   - 1 pc. 6 x 6 x 3″
   - 1 pc. 1 x 7 x 7″
3. *Hardware and Finishing Materials*
   - 1 Socket standard, full chain
   - 1 Nipple, brass, to fit socket above
   - 5 ft. extension cord (rubber insulation)
   - 1 plug, female
   - 1 pc. brass plate — 1/16″ thick, 1″ dia.
   - 3 pcs. screws, r.h. ½″
   - 24 ft. G.I. Wire #12 for the frame of shade
   - 1 pc. parchment paper for shade, approximately 4 sq. ft.
   - Paints of desired shades, shellac, varnish, or clear lacquer, pumice or rotten stone, oil, and sandpaper.

III. *Procedure:*

1. Make a full-size turning detail.
2. Get out the desired stock making reference to working drawings in plates 1 and 2 and the lumber bill above.
3. Square the upright stock to dimensions and mark centers on both ends.
4. On a drill press, bore a 5/32-in. hole for wire from both ends of the upright stock through the center.
5. Plug the hole in one end of each piece of the upright stock with a dowel rod. The open hole should be run on the dead center of the lathe, while the plugged end should be connected with the live center.
6. Turn according to the working drawing or the turning detail, starting on either piece of the upright. Finish the stock with shellac on the lathe.
7. Cut the base on the handsaw to desired diameter, leaving a clearance of approximately ⅛ of an inch for finishing on the lathe. Screw stock to the faceplate and turn to the dimensions given.
8. Assemble the turned stock, gluing the base and upright together.
9. The lamp should be finished in natural color with clear lacquer or varnish. It should be rubbed down to bring out its luster.
10. Wire the lamp. A piece of circular felt cut to the diameter of the lamp base may be glued to its bottom so that it will not mar any polished surface.
11. The frame for the shade may be made of tinned wire No. 12. All joints should be soldered.
12. Develop the pattern for the parchment lining, and then finish with the desired design. Mount on wire frame either by gluing or by lacing it.

The designs of the shades are only suggestive; the student may originate his own design according to his taste.

NOTE: The design in Plate I may be worked out by following the same procedure.

(*See Plate 2 on next page*)

SAFETY IN THE ELECTRICAL SHOP

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Because of the many dangers of electric shock and other electrical hazards incident to the operating of an electric shop, students in electricity should become thoroughly acquainted with the rules and laws of electricity before they participate to any great extent in the activities of the shop.

A careful review of *Safety Standards and Recommendations for School Shops*, and Safety Instruction Card No. 274 served as the source of the material in this chapter.[1] The safety precautions incident to the activities of this shop follow.

1. *"Removing and Replacing Fuses:* The dangers in removing and replacing fuses are those of electric shock and flashes. Electric shock is sometimes fatal, even from 110- and 220-volt circuits, and flashes can and do cause serious injuries. Both can be avoided by cutting off the electric current from the circuit

[1] *Safety Standards and Recommendations for School Shops*, Lancaster, Pa., 1934, pp. 83–94. Safety Instruction Card No. 274, National Safety Council, Chicago, Ill.

before attempting to do anything with the fuses, and by using insulating fuse pullers with which to handle them.

"If it is not possible to turn off the current from the circuit, stand on something that will insulate you from the ground. Keep your free hand behind your back or in your pocket, so that it will not come in contact with a grounded object. As an extra precaution, always turn your face to one side when removing a fuse. Better still, wear goggles. Never use a substitute for a fuse. You might be responsible for a serious fire. Replace burnt out fuses with new fuses of the same capacity unless you have reason to believe the capacity of the old ones was too high, in which event, use fuses of proper rating."[2]

2. *Fastening Plugs to Extension Cords:* Always be certain that a strain on the wire cannot separate the wire from the terminals. One good way is to tie the two wires into an Underwriters' knot. The connection can be made more secure by pouring sealing wax around the terminals. Do not let wax run through the wire holes.

3. Never leave a hot copper where someone may pick it up or step on it. Mark it *hot* if it must be left unattended.

4. Never pour any metal except under the supervision of the instructor.

5. Be careful of moisture when pouring molten metal. Moisture in molten metal will cause a violent explosion.

6. When turning the commutator, wear goggles.

7. When putting on or removing a battery from the charging line, always turn off the main switch to the battery charger or lamp bank. Remember that the gas from a charging battery is explosive and easily ignited from a spark.

8. When burning lead on a battery, make provision for blowing the gas away.

9. While working on a battery, never stand directly over it; an explosion will throw acid.

10. Before working on a circuit, always pull the switch or fuses.

11. Be certain that the line is clear from end to end before inserting a fuse or throwing in a switch.

12. Never touch any piece of electrical apparatus thoughtlessly. It may be "alive."

13. When working with battery acid, wear rubber gloves.

14. Remember that baking soda is a good neutralizer of battery acid, and that it may be applied directly to the skin.

15. Keep in your pocket, or lock up any fuse which you remove from the circuit on which you are working.

16. No student must ever, under any conditions, cause another student to be shocked. Low voltage is dangerous.

17. Never cut two wires at the same time. Doing so may cause a severe burn.

18. Never deliberately short-circuit a circuit.

19. Do not use metal measuring devices around electrical equipment.

20. Before inserting any electrical device, always test live voltage.

21. Remember that a fuse is a safety valve; never substitute anything for it.

22. Always play safe. Treat all unknown wires as "hot."

23. When you are in a damp or grounded location, do not touch electrical appliances such as toasters and heaters.

24. Do not "fool around" with the switchboard.

25. Never lay or drag the lamp cord over a metal pipe.

26. Be careful when working close to a "hot" exposed circuit. Always cover it with good insulating material.

27. When you have finished your work or wish to leave an electrical appliance, always turn off the current.

28. Insist that all workers in the electric shop know how to free a person caught on a "hot" wire.

29. Teach all students the safety rules and the procedure to follow in reviving victims of electrical shock.

30. "*Removing a person from a live wire:* When possible, shut off the current at the nearest switch. If a wire is on top of the victim, skip it off with a dry stick. A dry rope looped around either the wire or person may pull either away from the other. If you have no other means of freeing the victim, his outer clothing, if it is dry, may be used to pull him off. Be careful not to touch any part of the victim's body while it is in contact with the wire; otherwise, you, too, will be a victim. If the person's breathing has stopped, start artificial respiration and send for a doctor as soon as you have freed him."[3]

[2] *Ibid.*, No. 274.

[3] Cudahy (Wisconsin) High School, Educational Guidance Committee. Section on Safety, L. F. Barocci, Chairman. Educational Guidance — 9A, *Safety Unit*, Lesson 1. Unpublished course of study, 1937.

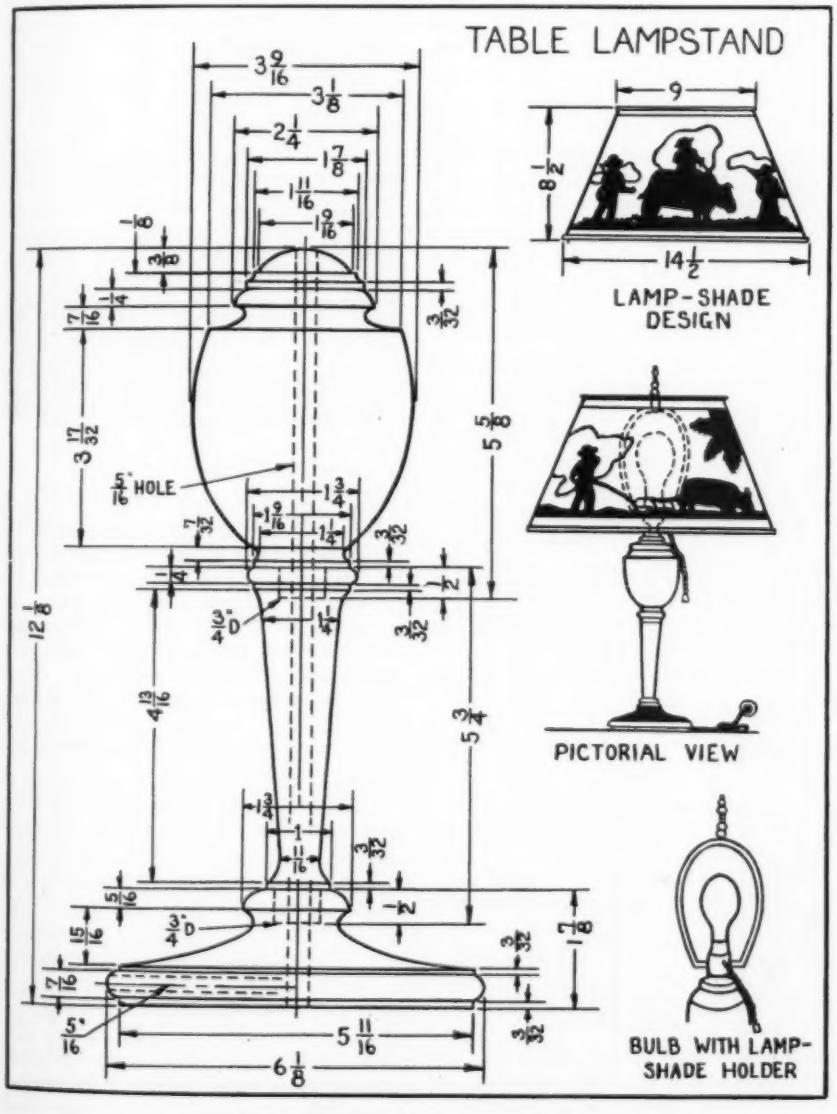


Plate 2 (See article on page 365)

COPPER CANDY DISH

WILLIAM R. STAGI
State Teachers College
California, Pa.

The copper candy dish described herein is an interesting project for students of junior high school age. It is easily made and, when finished, has all of the appearances of a commercial product. The student may vary the project by decorating it or changing the handle.

Material: sheet copper 26 or 28 gauge.

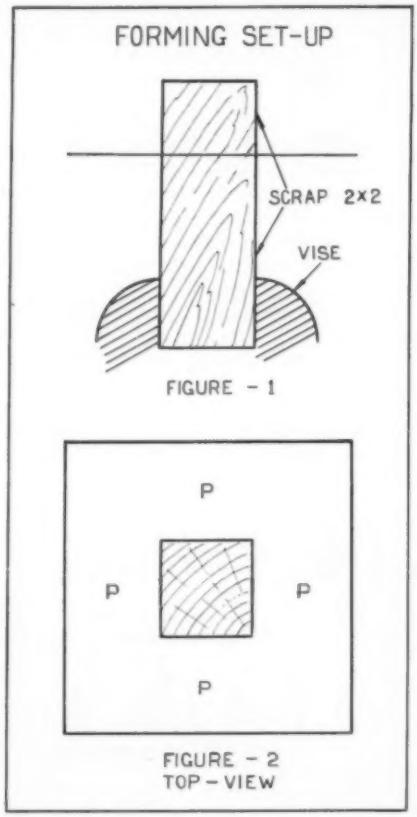
Copper candy dish

Procedure

1. Cut the copper into pieces, six inches square.
2. Polish with No. 2/0 steel wool.
3. If any decoration or tooling is to be done, do it at this stage before bending.
4. Clamp a scrap piece of 2 by 2 by 8-in. wood in a bench vise.
5. The dish will be shaped on this piece of wood. Locate the copper in a central position over the scrap wood, as shown in Figure 1.
6. Place another piece of 2 by 2 by 4-in. scrap wood over the piece of copper. The two pieces of wood should be in perfect alignment before bending. See Figure 1.
7. For forming, two students exert pressure with the thumbs at points marked *P* in Figure 2. The pressure must be equal on all sides. Bend until the desired shape is obtained.
8. Minor adjustments of the shape of the dish are easily made after this bending operation.

Procedure for Handle

1. The handle is made of two pieces of copper wire, 18 in. long. The wire thickness is optional, depending on the desire of the student and the material on hand.
2. Straighten the wires. Polish with No. 2/0 steel wool.
3. The wires are placed together. Clamp one end in a bench vise and fasten the other in a brace. Turn the brace until the desired spiral appears.
4. After twisting the handle, flatten the ends with a ball-peen hammer and trim off rough edges.
5. Fit the handle to the dish, by forming it into a half circle. This is done by hand or on one of the stakes.
6. The handle is soldered to the dish by using an alcohol torch.
7. After soldering, remove any stains and wipe dish clean with a soft cloth.
8. The dish is finished with a coat of lacquer.



Forming set-up for copper candy dish

NOTE. An interesting variation is easily obtained in the handle construction, by inserting a flat piece of brass that is a little wider than the diameter of the wires. This strip is placed between the wires before the twisting operation.

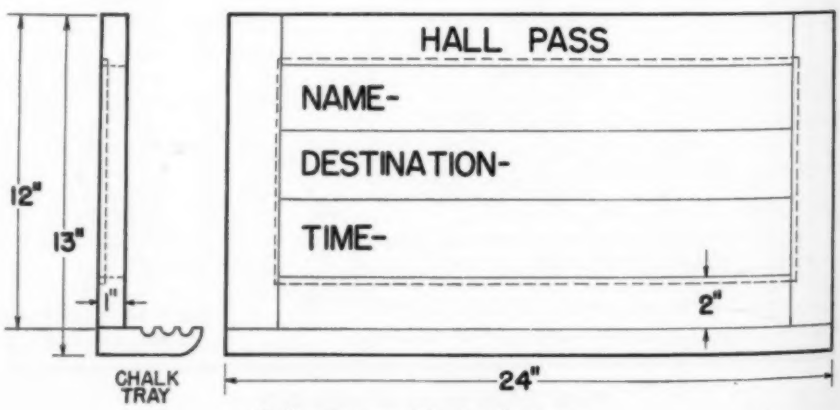
THE HALL PASS IN THE SCHOOL SHOP

G. W. SCHNEIDER
Metal Shop Instructor
El Monte Union High School
El Monte, Calif.

Students leaving the shop during class constitute a problem of control in every school shop. The use of the hall pass, described here has proved an effective means of student control.

The hall pass in use

The hall pass, as shown, is printed on a 6 by 12-in. piece of tagboard. A piece of 18-gauge sheet metal is folded around the hall pass with a ½-in. hem on the front side. This prevents the hall pass from being folded and placed in the student's pocket. The hall pass being carried in the hand is large enough to be seen by the hall guard or teacher who is checking for unauthorized persons in the hall.



Hall pass record in the classroom

How to Use the Hall Pass in the Shop

1. The student obtains the instructor's permission to leave the shop.
2. The student fills out the hall pass record board, removes the hall pass from the hook, and leaves the room, carrying the hall pass.
3. The hall pass is returned to the hook and the record board is erased when the student returns.
4. Rules and exceptions can be made to meet any emergency or unusual situation. It is well to keep a second hall pass on the instructor's desk to meet these emergencies.

ENGLISH FOR TRADE AND VOCATIONAL SCHOOLS

J. ALLEN MORRIS
Murray Vocational School
Charleston, S. C.

(See preceding articles in January, September, and November, 1948; January, May, June, November, and December, 1949; and February, 1950, issues.)

Letter Writing

Although many good texts on business letters, useful for reference and study purposes, contain detailed discussions of various kinds of letters, most of them are too adult in their approach to the subject, utilizing a vocabulary-level suitable for students in technical colleges, perhaps, but difficult for vocational school students of high school age. Their long chapters contain more information than young students can understand, assimilate, remember, and use. The following discussion, in which no attempt will be made to compete with these full-length texts, presents instead only a few suggestions for teaching some of the fundamentals of letter writing.

Addressing the Envelope

In the first year, students should be taught how to address an envelope neatly and correctly, putting the return address in the upper left corner. Most boys know how to address an envelope but either forget to use a return address or they write it on the back of the envelope. The instructor should be sure that each boy learns to use zone numbers whenever possible. This work should be assigned several times during the year, so that each boy will have an opportunity to form correct habits of addressing envelopes.

The Friendly Letter

In my school two letters are written during the first year: a friendly letter and an order letter. In the first of these, three uses of the comma are taught: between the name of the city and the state name or abbreviation (Charleston 6, S. C.); after the salutation (Dear Joe,); and after the close (Your friend,). A four-way margin is required, and spaces must be left between the salutation and the body, and between the body and the close. Capitalization in salutation and close must be correct. In this year's work a short, simple body is considered satisfactory, for the same letter is presented again in the junior and senior years. In the junior year paragraphing is stressed, and in the senior year the body of the letter (content, news, etc.) is emphasized. Before a boy can be graduated, he must be able to write a completely satisfactory friendly letter.

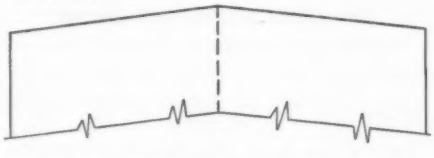
The Order Letter

In the order letter the student is required to leave a four-way margin, to leave a space between each two parts of the letter, and to arrange the articles ordered in itemized form. Regular industrial catalogs are used for this work. Each student practices writing this kind of letter until he can write one that is satisfactory. The chief stress is placed on uses of capital letters and commas, as in the friendly letter, except that a colon instead of a comma is required after the salutation.

The Business Letter Form

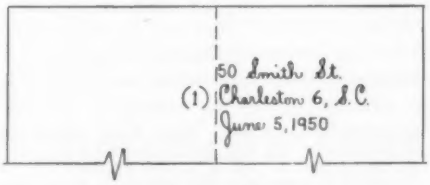
In the second year, special emphasis is laid on business letter form. Although there are many acceptable forms for business letters, I believe that a vocational school student should memorize one correct form and use it consistently for several years while in school.

To start teaching business letter form, I suggest that each boy fold a sheet of paper and crease it down the center from top to bottom. This is illustrated on the board as follows:

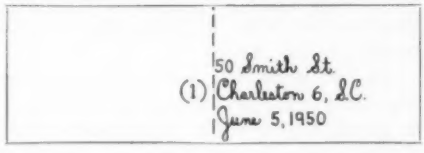


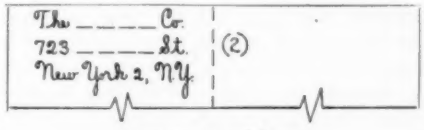
The center crease

The next step is to leave a top margin (½ to 1½ in.) as the sender's address is written, starting at the crease in the middle of the page. This insures a margin at the right.



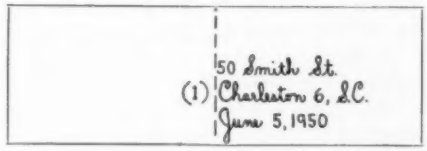
Sender's address

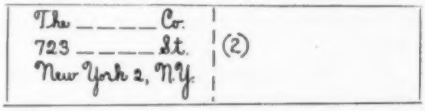


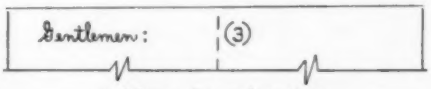


Receiver's address

Two lines are then drawn across the face of the "stationery" on the board, to indicate a space; then the receiver's address is written, starting from the left margin.

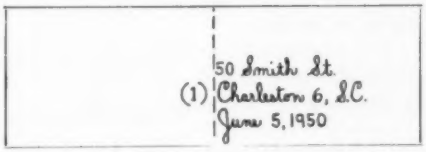


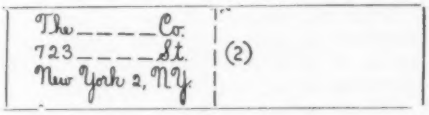


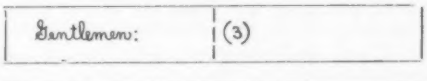


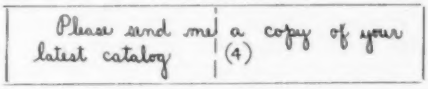
Adding the salutation

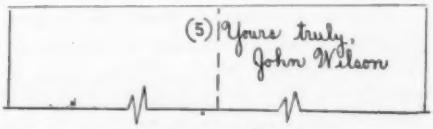
Another space is indicated, followed by the salutation and a colon:











The finished letter

Again, a space, and the body of the letter is written on the board, followed by another space and under it the close, starting the latter at the crease in the middle of the "paper."

As the instructor writes each part of the letter on the board, students copy it on their papers. For this sample letter I use a one-sentence body, requesting a catalog. Each part of the letter is numbered on the board, and emphasis is placed on the spaces between parts. In a five-part letter there will be four spaces. The result is a simple block-form letter, suitable for all ordinary business letter work in the future. If a boy already knows a correct form different from this, he is permitted to use the one he knows; otherwise this is considered a standard form to be used throughout all classes.

In order to give students practice in writing letters, at least five letters must be written, some of them several times.

I. Write a letter to some company, asking for a catalog.

II. Write a letter to a supply house, ordering parts for shop use.

III. Write to a company advertising in a magazine, and request an advertised sample.

IV. Write a letter to a company which has shipped you some goods which were defective (broken, not what you ordered, etc.,) and ask the company to make the shipment good or return your money.

V. Write a letter to some large company and ask for an application blank.

These letters are written individually, one letter at a time. In each letter the student is taught the things he needs to learn. He then writes another, trying to make it perfect.

If a student's letter shows that he does not understand how to use salutations, he is assigned the following to study:

Salutations of Business Letters

When you write to a store, a factory, a company, or any organization employing a group of people, use "Gentlemen:" as the salutation.

When you are writing to someone whose name you know, use "Dear Mr. ——:" as the salutation.

If you are writing to a man whose name you do not know, addressing him by a title (principal, manager, foreman, owner, etc.), use "Dear Sir:" as the salutation.

Do not use "Dear Sirs:" or "Sir:" or "Sirs:" in business letters.

After he has studied these, he is given a folder containing examples of salutations in real business letters. Using these as models, he then writes another letter (or several more) until he knows how to use salutations correctly.

Another boy may make an error in the close of his letter. He studies a list of several standard forms (Yours truly, Very truly yours, Yours very truly, Sincerely yours, Yours sincerely,) and examines several business letters in which these forms are used. For the average student I suggest the constant use of "Yours truly," using a capital "Y" and a small "t," with a comma at the end. Many boys need to be cautioned about the spelling of "Yours" (without an apostrophe) and "truly" (without an "e" before the "ly").

If a boy forgets to leave spaces between the parts of his letter, he is told the reason for the spaces ("to make the letter look better") and required to rewrite his letter neatly.

If a student writes the five letters and still needs more work on business letter form, he is given a sheet containing ten simple letter-writing jobs. He continues writing letters until he actually knows how to write a neat, correct letter. In the junior year his knowledge of the "Inquiry" letter is retested. If he has forgotten any of the things he should know, he must again learn them by writing more letters.

In the junior year several other letters are required. The order letter is again tested. Each student is given a parts catalog containing articles used in his trade and told to order "at least four things." His letter must be correct in form, and show that he knows how to order goods properly, giving such information as catalog numbers, prices, quantities, methods of shipment and payment. If he obviously knows how to write this kind of letter, he receives credit for it and goes on to another assignment; otherwise he continues to write order letters until he does know how to write one that is completely satisfactory.

The Letter of Recommendation

In this year a simple letter of recommendation also is written. In this the boy must show that he has an understanding of the things an employer wants to know about a new man. The first letter written is usually incomplete, weak, and unsatisfactory. The writer then studies a chapter in a good business letter text which gives examples of this kind of letter, together with suggestions as to its content. He later writes another letter — or several more — until he knows how to write a fair letter of recommendation, including the name of the person being recommended, a comment about his character and his reputation in school, and some mention of the line of work for which he is trained. If possible, the person's specialty is described briefly, and the letter is ended with a hope that the reader will give the subject of the letter a chance to show that he can be valuable to the employer. Occasionally a boy takes the opposite point of view, writing a letter which warns the prospective employer against someone whose character and working-record are bad. The chief purpose of this letter is to make a boy realize, while he is still in school, that his references will in later years be writing letters for him. Smart boys learn to appreciate the value of good records to help them in their after-school careers. Stress is placed on the fact that employers and school officials usually tell the truth, good or bad, in their letters of recommendation.

The Sales Letter

For the sales letter, also written in the junior year, the same method is employed: a chapter in a text helps boys who cannot write a satisfactory sales letter without assistance. Each accepted letter must contain sentences and paragraphs that will attract the reader's attention, hold his interest, make him want to buy, and persuade him to act quickly to examine and purchase the article offered for sale in the letter. The last (action-paragraph) is the hardest for students to write. The instructor should teach several simple tricks of getting the prospective customer and the would-be seller together; for example, a self-addressed post card or a phone number with a suggested time for calling to arrange an interview.

The Letter of Application

The letter of application, because of its importance to the student, should be most carefully taught and thoroughly mastered. No matter how long the period of learning may be, each boy should be required to learn how to write a better-than-average letter of application. As I assign this letter, I suggest that each student double his age as if he were writing the letter long after graduation. He is told to claim imaginary education beyond the high school level (night school work, correspondence school courses, or college courses) and imaginary experience, and to apply for a position in the $3,600-$6,000 a year bracket. The first letter is usually weak and badly organized; then the writer is given the following mimeographed sheet and told to study it carefully:

Application Letter

In your letter of application be sure to include the following:

1. The reason for your letter (usually a reference to an advertisement in a newspaper

(Continued on page 18A)

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LETTER WRITING

(Continued from page 370)

or to a *tip* from a friend who knows of a vacancy).

2. Your age, weight, height, physical condition.

3. Your education (schools you have attended, the type of training you have had, also evening school work, college or correspondence school courses).

4. Your experience (where you have worked, how long, under whose direction, etc.; or, if you have never had a job, a promise to work hard if given a chance.)

5. Names, titles, and addresses of at least three people who can give facts about your ability, character, etc. Phone numbers are useful if you can supply them.

6. End your letter with a polite *question, asking permission* to talk with the employer (the man who is to read your letter) at some time that is convenient from his point of view.

Four very important things should be included in every letter of application: *experience — references — interview — education.* (These are not arranged in the order in which they appear in the letter.)

Notice that these four words start with the letters e-r-i-e. An easy way to remember the four words is to memorize this sentence: "Whenever you write a letter of application, be sure to include *erie.*"

In John T. Shuman's *English for Vocational Schools* you will find several pages (161–165) of helpful suggestions about writing application letters. Refer to this book if possible.

After a boy has studied these suggestions for a while, he writes another (and a much better) letter. About three months later he is retested to see how much he has remembered and what he still needs to learn. This process of writing and studying continues until each boy obviously knows how to write a good letter of application. Just before he is ready for graduation, he is given a final test, to be sure that he will be able to write a letter, after he leaves school, that will make a favorable impression on a prospective employer. Stress should be laid on the reason for this kind of letter: *to secure an interview* rather than "to get a job." Each student should be urged to give at least three references and should be required to *ask for an interview* instead of telling the employer that he will be glad to have one. At this point special work on appositives is often necessary, together with instruction in the *you* attitude, the need for courteous wording (using "May I . . . ?" or "Will you please . . . ?"), and for good style (not starting every sentence with "I" followed by a verb, but starting some of the sentences with prepositional phrases and dependent ["weak"] clauses).

The collection letter is presented partly in the junior year and in more expanded form in the senior year, during which the *Collection Letter Series* is presented:

1. Write a letter in itemized form, listing charges for work done on big jobs ($2,000-$5,000). Use three or four items, each costing hundreds of dollars.

2. Write a reminder letter, telling the customer when you wrote the first letter, giving the total amount of his bill, and asking him to pay. Do not use the itemized form in this letter.

3. Write a letter inviting the customer to visit you at your place of business to talk over his account with you. Mention the two letters already sent to him, and again give the amount of the bill.

4. Before starting to write this letter, ask for a folder containing helpful suggestions for collection letters. Read the information in the folder carefully; then write a letter trying to persuade the customer to pay his bill.

5. Write a short letter mentioning the amount of the bill and the fact that you have sent four letters to the customer about it. Tell him to carry out his part of the business transaction: to pay you for the work he had you do for him.

6. After you have tried five letters and have not been able to collect the money owed

(Continued on page 20A)

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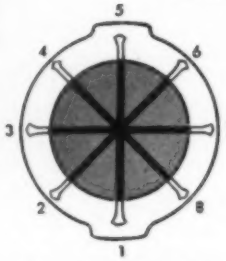

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MILLERS FALLS COMPANY GREENFIELD, MASSACHUSETTS

LETTER WRITING

(Continued from page 18A)

to you, there is only one thing left to do: put the account into the hands of a lawyer or a collection agency. Before doing this, however, try one more letter. Tell the customer that if he does not pay his bill by a certain time (about two weeks from the time of this letter), you will be forced to turn his account over to your lawyer for collection.

Letters Nos. 1 and 2 are studied separately in the junior year as *Itemized Bill Letter* and *Collection Letter* jobs, in preparation for the work of the senior class. In the former letter the student learns how to itemize charges, listing kind, quantity, and cost of goods or services; to express the hope that these have been satisfactory; to invite future business; and to request payment politely but firmly. The second is shorter and simpler, chiefly a reminder to the customer who has failed to pay on receipt of the first letter.

Most boys seem to have little difficulty with letters Nos. 3, 5, and 6. For letter No. 4, the student is given a folder containing a number of helpful suggestions, illustrations, and examples. He is told to use one of the standard appeals "Complimenting the Debtor," "Helping Him to Pay," "Fairness," "Feeling Appeals," "The Debtor's Own Interest." This is the hardest letter of the six and in real life, the most important, for the first three bring in almost all outstanding accounts, and good businessmen prefer not to have to use letters Nos. 5 and 6 if they can possibly avoid using them.

When a student has satisfactorily completed all these letters, the work ranging over a period of four years, he is well prepared to write whatever letters he may be required to use after he leaves school.

(*To be continued*)

DRILLING AN EXCEEDINGLY SMALL HOLE

A technician at the Naval Ordnance Laboratory, White Oak, Md., recently drilled what is believed to be the smallest hole ever drilled in metal in this country.

Measuring 6/10,000 of an inch in diameter, the opening was drilled in a piece of platinum used in the hydraulic system of one of the navy's new weapons.

A 4/1000-in. diameter pivot drill accurately filed down was used for this purpose and was attached to a standard jeweler's lathe. The drill was kept central through the use of a microscope during stoning.

The platinum was secured to a faceplate which had been electrically insulated. The shank of the faceplate containing the platinum was then placed in a collet and the entire system was inserted in the reciprocating spindle of a tailstock.

In order to determine when the drill had made contact with the platinum the clamp of a hot wire of an ohmmeter was attached to the insulated faceplate holding the work to be drilled. The ground wire was attached to the lathe bed.

The forward motion of the spindle in the tailstock caused the point of the drill and work to meet forming a contact which immediately registered on the ohmmeter. The depth of the drilling operation was regulated by an adjustable stop set on the reciprocating spindle.

INDUSTRIAL-ARTS CERAMICS

WILLIAM D. CHATFIELD

Teachers College of Connecticut

New Britain, Conn.

Working with clay is an interesting activity and boys and girls enjoy it. The little people in the first grade and the big people in the upper grades find that pottery has unlimited attractions. In as much as many of us feel that it should be included in our shop experiences the following may be of interest.

Clay — kind of soil, alumina, silica, and water — soft and plastic when moist — molded retains shape — hardens upon drying and be-

(Continued on page 23A)

BIGGER than ever!

1951

FORD MOTOR COMPANY

INDUSTRIAL ARTS AWARDS

NEW REGIONAL JUDGING

THANKS largely to the valued cooperation of industrial arts teachers and administrators, the 1950 Industrial Arts Awards competition was the most successful to date, attracting approximately 2,400 entries for the final judging which was held at the Museum of Science and Industry in Chicago.

Success of the 1950 program and indications of even greater interest next year have paved the way for an expanded program in 1951.

NEW FOR '51 is the Regional Awards Plan. Entries will first be judged in three regional groups, with winning entries going on to the National Finals.

Under this plan, the chance of one of *your* students winning an award is greater than ever. Entries from your classes will compete first with entries from other schools in your own section of the country. And in most cases, your entries won't have to travel so far.

IN ADDITION, the number and value of Awards will be increased. *And again, for 1951, it is planned that the instructors of students earning Outstanding Achievement Awards in the final judging will in turn receive awards of a similar nature.*

This is *your program*—guided by educators . . . approved by the National Association of Secondary-School Principals . . . designed to increase student interest in hand skills, and to promote among young people a greater sense of pride in fine workmanship.

FORD MOTOR COMPANY

WHO IS ELIGIBLE?

Boys and girls in the 7th through 12th grades in *any* type of school (public, parochial, private). MUST be enrolled in at least one shop or drawing course. There is no entry fee.

ENTRY CLASSES

Major divisions include wrought metal . . . patternmaking and molding . . . wood working . . . electrical . . . drawing . . . machine shop . . . plastics . . . printing. Each division includes a number of classifications, further divided according to grade levels.

AWARDS

Regional winners will receive cash awards plus emblem pins and a chance to win national prizes including expense-paid trips to Dearborn and Detroit for student winners *and their instructors.*

It is none too early to get your students working now on projects for the 1951 Industrial Arts Awards. For full information when available, use this coupon.

INDUSTRIAL ARTS AWARDS
Ford Motor Company, 2917 Schaefer Road, Dearborn, Michigan

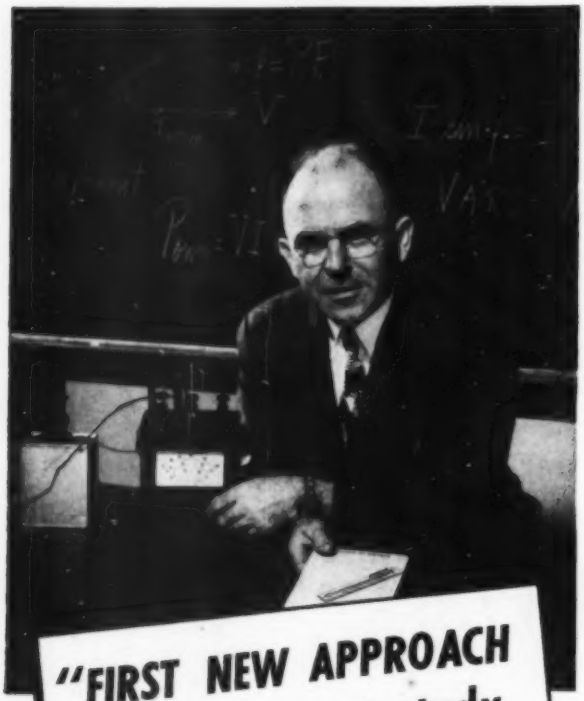
Please send me full information and _____ entry blanks, as soon as available, for the 1951 Ford Motor Company Industrial Arts Awards.

Name _____

Street _____

City _____ *State* _____

I teach course in _____ *at* _____
school name



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- **Watts, power factor, and vars can be quickly determined**
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Complete, progressive and profusely illustrated, this new text is an outstanding example of good instruction material. The pattern is that of presenting the content through clear, illustrated information sheets, and of providing application through definite assignments and step-by-step instructions for assignment drawings. This text is ready-to-use, requiring no additional organization or preparation of material. Because of the logical sequence of instruction units, it is possible to give effective individual instruction, and to supervise efficiently groups including various levels of proficiency.

The text and companion workbooks is recommended for junior and senior high school drafting and mechanical drawing classes, for technical and beginning engineering groups, and may be easily adapted to home study. A Teacher's Key, showing the completed assignment drawing, is designed to simplify correcting and evaluating students' drawings. A series of four Workbooks will be available using actual drawing paper and giving starting points for each assignment drawing.

Check These Outstanding Characteristics!

- ★ *Instruction material is ready-to-use, as is.*
- ★ *Students of diverse ability may be included in same group. Beginners and advanced students may be taught simultaneously.*
- ★ *Can be used effectively by teachers who lack practical drafting room experience.*
- ★ *Each unit built on preceding units so reference and review can easily be made.*
- ★ *Units are so complete that unnecessary time-wasting questions of procedure are avoided.*
- ★ *More supervision can be rendered and additional aid given when needed, as time is spent "teaching," not "preparing to teach."*

DRAFTING SIMPLIFIED is available for immediate distribution. The Teacher Key and Workbooks to follow in October. We invite you to examine this superior text. *Write Dept. IA-1150.*

DELMAR PUBLISHERS INC.
ALBANY 1, NEW YORK

INDUSTRIAL CERAMICS

(Continued from page 20A)

comes brittle — colors, white, yellow, green, gray, red, black, and blue.

Ceramics — clay plus building plus firing.

Clay — purchase in moist or dry form, dig (if near clay bed), grind, add water, sieve through ⅛-in. mesh, allow exposed until right consistency.

Clay beds — spread throughout Ohio, New York, and New Jersey.

History — Potter's wheel used about 2000 B.C. Chinese — world's greatest potters about 200 B.C. Early American: Virginia, 1650, small potteries making domestic utensils; New Jersey, 1671, John Dwight made patented ware; Connecticut, 1753, John Pierce turned out domestic ware.

Coil Building

1) Make design. (2) Make template. (3) Wedge. (4) Form base. (5) Score and dampen. (6) Add coils. (7) Weld. (8) Shape — profile, top, concentric. (9) Adjust thickness. (10) Shape base — foot. (11) Dry — air to contact all. (12) Fire. (13) Glaze. (14) Fire.

Modeling

1) Study photograph — proportions. (2) Practice adding appendages. (3) Wedge to approximate proportion. (4) Model. (5) Keep moist until good design has been achieved. (6) Fire. (7) Glaze. (8) Fire.

Keep Clay Pieces Moist and Workable With Moist Cloth and Damp Closet

Throwing:

1) Secure bat to wheel. (2) Wedge. (3) Dampen clay and secure in center of bat. (4) Center ball of clay (*most important*). Left elbow against left hip — left palm on clay — rotate clay — right fingers pull toward clay and the left palm. (5) Open. Left hand as in centering — right thumb on left index finger, right fingers to open clay, press down in center. Keep clay and hands moist. (6) Shape. Have shape in mind and work only toward it. (7) Smooth with elephant's-ear sponge. (8) Allow to dry — leather hard — air contact all. (9) Center piece head down on wheel head. (10) Finish foot for piece to stand level. (11) Fire, decorate and fire. This is one of the most interesting and possibly most difficult in the ceramics field. The centering of the clay is of utmost importance. It is well to allow the student a few trials at the wheel and then the instructor to center the piece and allow the student to go ahead from there. Do not make the mistake of centering the piece more than twice.

Turning.

1) Center piece. (2) Fasten to bat. (3) Level top. (4) Study outside contour and turn. (5) Finish inside surface. (6) Cut from bat. (7) Center piece head down on wheel head. (8) Finish foot. (9) Fire, glaze, and fire.

Decorations

1. Sgraffito: Add slip to leather hard piece — slip made from different colored clay, incise, allow to dry slowly.

2. Modeling on (Wedgewood): Clay added to piece — both same moisture content; score, dampen, weld; allow to dry slowly.

3. Incise: Cut design in leather hard piece.

4. Slip painting: Paint slip design on piece, store in damp closet, allow to dry very slowly.

Stacking — Firing — Drawing Kiln

1) Wash kiln — stilts and all with kiln wash china clay and flint (2 handfuls to quart of water). (2) Classify ware — temperature needed — size and shape. (3) Place props for first shelf. (4) Place ware. (5) Place shelf — place ware on shelf. (6) Place cones — visible from hole in door. (7) Shut door. (8) Heat slowly until red — then rapidly. (9) Watch cones — turn off heat when proper temperature has been reached. (10) Allow as long to cool as to heat. (11) Remove ware.

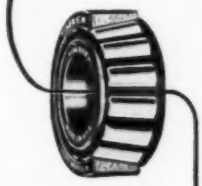
Glaze and Glazing

Glaze consists of metallic oxides, flint, feldspar, and borax.

1) Soak bisque in water. (2) Pour water off glaze. (3) Mix glaze. (4) Wipe off ware. (5) Pour glaze inside — cover all inside — pour out. (6) Pour on outside — cover quickly. (7) Put on stilts on clean board. (8) Allow to dry. (9) Scrape top and bottom. (10) Wet with brush and paint glaze on top and bottom. (11) Allow to dry and fire.

(Continued on page 24A)

TIMKEN *Zero precision bearings give* SHELDON *LATHES GREATER ACCURACY*



The type of spindle bearings is doubly important in a school lathe. With novice operators, lathe bearings take a lot of abuse. Ordinary solid bearings must be constantly re-bored, honed and re-fitted or completely replaced if a school lathe is to retain close accuracy.

Today, with increasing emphasis on *precision* in machining, with ever closer tolerances in industry the logical lathe for the school shop is the Sheldon TS56B because it is not only the safest school lathe but also because it has Timken "Zero Precision" tapered roller spindle bearings. These finest obtainable bearings (run-out or eccentricity restricted to less than .00015 in.) not only hold their extreme accuracy without maintenance but also permit the new higher machining speeds required for efficient use of the newer cutting materials.

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INDUSTRIAL CERAMICS

(Continued from page 23A)

Be careful when stacking glaze ware that it does not touch neighboring piece as they will unite.

Slip Casting

1) Obtain pattern and size. (2) Make mold (plaster). (3) Pour slip in mold. (4) Note time and pour out slip. (5) Add appendages. (6) Allow piece to dry. (7) Fire decorate and glaze.

Tile

1) Wedge. (2) Shape to tile. (3) Decorate. (4) Dry. (5) Fire, decorate, and fire.

Plaster

Uses of: wedging board, bats, molds.

Mixing

Water Qts.	*Plaster Lbs.*	*Plus*	*Water Pts.*	*Plaster Lbs.*
1	2¾		1	1⅜
2	5½		1	4⅛
3	8¼		1	6⅞
4	11		1	9⅝
5	13¾		1	12⅜

Materials — Equipment — Supplies

Newspaper, pencil, ruler, shears, brushes, clays, water, storage for clay — airtight, airtight damp closet, bats, elephant ear sponges, modeling tools, containers for water, wedging slab, slightly absorbent working space, models — designs — plans, potter's wheel (not essential), turning tools (not essential), cones, kiln wash, grog (not essential to purchase), stilts, glazes, gum tragacanth, 20-, 40-, 80-mesh sieves, plaster (potter or casting plaster), containers.

Glossary

appendage — an added part — handle, tail, or leg.
bat — a flat slab of plaster usually round.
bisque — ware which has been fired once but not glazed.
cone — temperature gauge for the kiln.
fire — heat ware in the kiln.
glaze — applied to bisque for color and liquid proofing.
green — unfired clay.
incise — to cut through.
kiln — pronounced kill — a furnace in which to fire the ware.
profile — side view.
size — to cover surface in order that plaster will not adhere.
slip — clay diluted with water to liquid state.
stack — to place the ware in the kiln.
stilts — supports for glazed ware while firing.
template — a profile pattern.
throwing — forming ware on the potter's wheel.
turning — shaping with the aid of a tool on the potter's wheel.
weld — to make the surface smooth — rubbing two coils together.
wedge — cutting clay over a wire and pounding on the wedge slab (to remove the air from the clay).
wheel — potter's wheel.

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ASSOCIATION NEWS

(Continued from page 6A)

president; Carroll Fuller, New Bedford Vocational High School, vice-president; Kathleen G. Delaney, Lowell Girls' Vocational School, secretary; and Vincent P. Kramer, Springfield Trade High School, treasurer.

♦ The Kentucky Vocational Association officers for 1950–51 are: Stanley Wall, University of Kentucky, president; Miss Maurine Collins, Maysville High School, vice-president; and Maurice Baker, University of Kentucky, secretary-treasurer.

♦ The North Carolina Vocational Association officers for 1950–51 are: Mrs. Clarinda A. Britt, president; R. J. Lyday, vice-president; Miriam W. Blair, vice-president; Sidney High, vice-president; George H. West, vice-president; Louise Lowe, vice-president; and M. D. Thornburg, secretary-treasurer.

♦ The Wisconsin Association for Vocational and Adult Education officers elected for 1950–51 are: John Tepoortan, Madison, president; C. D. Rejahl, Madison, secretary-treasurer; Calvin Evans, Milwaukee, vice-president, general subjects; Frank Woerdehoff, Madison, vice-president, teacher training; Arthur Larsen, Sheboygan, vice-president, guidance; H. L. Sherman, Menasha, vice-president, local directors.

Personal News

♦ Dr. John T. Wheeler, head of the teacher training program in the College of Education, University of Georgia for 33 years, died on May 17.

His influence in training teachers of agriculture was felt throughout the United States.

Born in Towanda, Pa., in 1886, Dr. Wheeler earned his Ph.D. degree at Cornell University.

During his professional career, he served as principal and teacher of science and agriculture at Osceola, Pa.; instructor at a Pennsylvania State Normal School; supervisor of schools at Westfield, Pa.; assistant professor of horticulture at Massachusetts Agriculture; and since 1917, head of the department of vocational education at the University of Georgia.

A life member of the American Vocational Association, Dr. Wheeler served a term as president of the Georgia Vocational Association. He is listed in *Who's Who in America, Who's Who in Agriculture, Who's Who in the South*, and *Leaders in Education*. He served as a special editor of the *Agricultural Education Magazine*. His many other honors included membership in

(Continued on page 26A)

HOME MECHANICS

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By John W. Dean. An advanced manual of leather work, reflecting thirty years of experience in leather work and teaching leathercraft. Five major sections: Leathers, and Tannages; Tools; Processes; Designs; Projects. Contents include: weights and grades of leather; buying leather; modeling tools, special modelers, stipplers; stamping tools; incising knives; cutting leather; punches; spacing gauges; tooling; stamping; coloring; cementing; sewing; lacing; design sources; patterns. Projects and designs include: Purses; key cases, scissors cases; picture frame; small handbag; memo book cover; table mats; belts; book covers; wall plaques; album cover; handbags; portfolio and other other valuable projects. Write for approval copy. $5.00. Clip this.

GENERAL LEATHERCRAFT

By Raymond Cherry. Easy to understand instructions for 35 projects, including designs and 190 illustrations. Revised 1949. $1.50 At your craft supply dealer or if not available, order direct.

107 LEATHER DESIGNS

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PERSONAL NEWS

(Continued from page 24A)

the Phi Kappa Phi, Alpha Zeta, Phi Delta Kappa, and Kappa Delta Pi.

♦ GEORGE F. REINHARD, of Grand Rapids, Mich., formerly connected with the Oliver Machinery Company and the old Grand Rapids Hand Screw Company, and later the owner and manager of the Standard School Fixture Company, died at his home after a prolonged illness on Tuesday, September 12, 1950.

For the past 25 years Mr. Reinhard has been giving a professional service to the school administrators in Michigan on the matter of complete shop equipment layouts.

For many years Mr. Reinhard was the Michigan representative for the Leonard Peterson Co., Inc., manufacturers of laboratory equipment; Universal Bleacher Co., and Sisco, Inc., manufacturers of steel desk tops.

♦ GEORGE MORRISON GAITHER, who retired as supervisor of industrial education in the Baltimore public schools in 1941 after a half century of devoted service to the youth and adults of Baltimore, Md., died on June 22.

Born in Baltimore in 1871, Mr. Gaither attended the public schools and was graduated from the second class of the Baltimore Manual Training School, now the Baltimore Polytechnic Institute. He studied industrial education at Columbia University.

While the Baltimore Manual Training School marked the beginning of industrial education in Baltimore, Mr. Gaither was largely responsible for the introduction of manual training into the public elementary schools in 1903. Upon graduation from the Manual Training School, he was appointed a member of the faculty there and soon thereafter the Board of School Commissioners placed him in charge of the first system of manual training in the public schools.

He served also as supervisor of home economics when this subject was introduced into the Eastern High and Western High Schools. Following this period, home economics was developed under his supervision in the Baltimore elementary schools.

World War I temporarily stopped the expansion of industrial arts, and Mr. Gaither turned his attention to the job of training men for the war industries. Following the war, the industrial-arts program was expanded to include all junior and senior high schools under Mr. Gaither's leadership.

In 1918 he organized the Carroll Vocational School, now the Edison Vocational High School, and he assisted in planning the Ottman Mergenthaler Vocational High School of Printing in Baltimore.

At one time an instructor at the Baltimore Normal Schools, Mr. Gaither was also a pioneer in industrial technical training work at the Johns Hopkins University and the University of Maryland.

The early history of industrial education in Baltimore is, in large measure, the lifework of George Morrison Gaither.

♦ CONRAD A. CONLEY, director of trade and industrial education for Escambia County, Fla., and president of the Florida Trade and Industrial Education Association, was killed in an automobile accident last spring which also caused the death of his wife.

Identified with Florida's program of vocational education since 1927, Mr. Conley was considered a pioneer in this field.

With a background of teaching manual arts and cabinetmaking, Mr. Conley served as shop co-ordinator, and later as director of the Brewster Vocational School in Tampa. He left the Brewster School to accept the post of director of vocational education in Florida's Pinellas County. He served in this capacity until he was elected director of vocational education in Escambia County.

Mr. Conley was a member of the staff of the University of Florida Extension Division and taught the special summer session for trade and industrial personnel in Tallahassee in 1949. He was a member of the National Council of Local Administrators of Vocational Education and Practical Arts, the American Vocational Association, the Pensacola Chamber of Commerce and the Rotary Club.

During World War I, Mr. Conley served in the Marine Corps. He was born in Sevier, N. C., in 1898.

♦ ROBERT W. BLAESING is the instructor of printing at The Stout Institute, Menomonie, Wis. He holds a master's degree from Stout and had experience in the printing trade and the teaching of graphic arts.

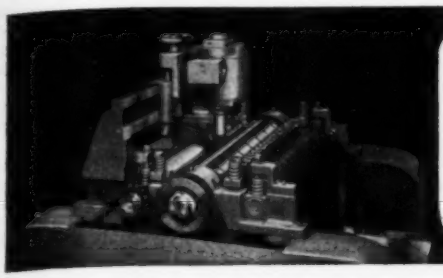
♦ ROBERT SWANSON has joined the teaching staff of The Stout Institute, Menomonie, Wis., as instructor of industrial arts. He received his master's degree at Stout. He also attended North Dakota School of Agriculture and was assistant instructor on the Stout faculty last year.

♦ At Fenn College, Cleveland, Ohio, the following appointments to the faculty were made: MICHAEL PHILLIPS as assistant professor in structural engineering; JAMES M. MADIGAN as instructor in chemical engineering in the School of Engineering; and FREDERICK LEE as business co-ordinator of co-operative training; GEORGE LEECH as acting head of personnel guidance.

♦ FRANK R. FLOWER, assistant superintendent of schools in Atlantic City, N. J., died at his home in Marven Gardens, a suburb of Atlantic City, on May 30.

He was a pioneer in the development of New Jersey's program of vocational education, and taught in the Atlantic City Vocational School when it was organized in 1912. He was a graduate of the Williamson Trade School.

(Continued on page 28A)



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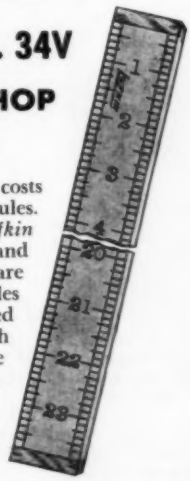

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PERSONAL NEWS

(Continued from page 26A)

He was a life member of the American Vocational Association, and also a member of the National Education Association, a past president of the Atlantic City Teachers' Association, and past president of the Atlantic City Rotary Club. He was active in many state and national educational associations.

♦ WILLIAM P. SPENCE has been appointed advisor in industrial arts and crafts at the Richmond Professional Institute, College of William and Mary, Richmond, Va. This year marks the beginning of an organized industrial-arts teacher training program at this institution. A new building is scheduled to be constructed soon which will provide space for a larger shop.

♦ J. GOULD SPOFFORD, trade and industrial teacher trainer in the Vocational division, New Jersey State Department of Education, until his retirement in 1945, died at his home in Norway, Me., on June 16.

A native of Maine, Mr. Spofford received his professional training at the University of Maine and the Newark College of Engineering.

He served as an educational consultant to the Ordnance Department, U. S. Army, in World War I.

An active member of the New Jersey Vocational and Practical Arts Association and the New Jersey Educational Association, Mr. Spofford was also a life member of the American Vocational Association.

♦ JOHN W. KARNES has accepted a position as assistant instructor in industrial education in the College of Education, University of Connecticut, Storrs, Conn.

♦ VINCENT GOURLEY, who was actively engaged in industrial education for many years in the Detroit Public Schools, and more recently on the faculty of the Henry Ford Trade School, died on June 10, 1950.

He is the author of several books and many professional articles in the fields of industrial arts and vocational education.

♦ WILLIAM HAWLEY has been appointed assistant superintendent for vocational education for the state of Michigan.

♦ DR. HAROLD SILVIUS has been promoted to full professorship in the College of Education, at Wayne University, Detroit, Mich.

♦ DR. RALPH WENRICH, former assistant superintendent for vocational education, for the state of Michigan, has been appointed professor of vocational education at the University of Michigan.

♦ M. D. MOBLEY, director of vocational education of the state of Georgia, has been elected executive secretary of the American Vocational Association. He will take the place of Dr. L. H. Dennis, the present incumbent.

Mr. Mobley will take over his duties on January 1, 1951. He was president of the A.V.A. in 1945.

♦ DUDLEY M. CLEMENTS, 61, assistant chief of the Agricultural Service, United States Office of Education, and for more than 30 years a recognized leader of vocational education in agriculture, died July 25 at Prince Georges General Hospital in Cheverly, a suburb of Washington, D. C.

Mr. Clements first began teaching agriculture in 1911.

A member of the staff of the Office of Education since 1936, Mr. Clements had previously served as Federal Agent for Agricultural Education in the southern states and Puerto Rico.

Much of Mr. Clements' work was concerned with the Future Farmers of America in the South. He served on the FFA's National Advisory council for 14 years. He assisted in many ways in building the AVA organization, and his co-operation with the AVA was intelligent and earnest. His contributions in connection with AVA legislation which resulted in the George-Deen Act were significant.

♦ HENRY C. GROSECLOSE, 58, one of the fathers of the Future Farmers of America organization, died in a Bluefield, Va., hospital on June 4.

A leader in Virginia state agricultural education, Mr. Groseclose had more recently been superintendent of schools in Virginia's Bland County. He retired several months prior to his death.

He was teaching agriculture in Buckingham County when he conceived the idea of the FFA. First known as the Future Farmers of Virginia, the organization soon expanded and became nationwide in scope. He served as national treasurer from 1931 to 1941, and as national executive secretary from 1928 to 1931.

♦ WILLIAM H. ARMSTRONG, Leon Godchaux High School, Reserve, La., is interested in the evolution of the carpenter's hand plane. He has about 30 different types of planes dating from about 1850 to our present types. He would like to appeal to others interested in planes, and to all who might help him in his study of the evolution of the plane.

Any co-operation will be highly appreciated.

♦ EDWIN SIEFERT has been appointed assistant professor of machine drawing at The Stout Institute, Menomonie, Wis. He replaces Daniel Green, who died during the summer.

Mr. Siefert holds a master's degree from Wayne University, and taught for the U. S. Government and the University of Illinois before coming to Stout.

♦ GLENN DUNCAN, formerly instructor of industrial arts in the University of Missouri Laboratory School, received his doctor's degree in industrial education from the University of Missouri in June and is now a member of the industrial-arts department at Eastern Illinois State College, Charleston, Ill.

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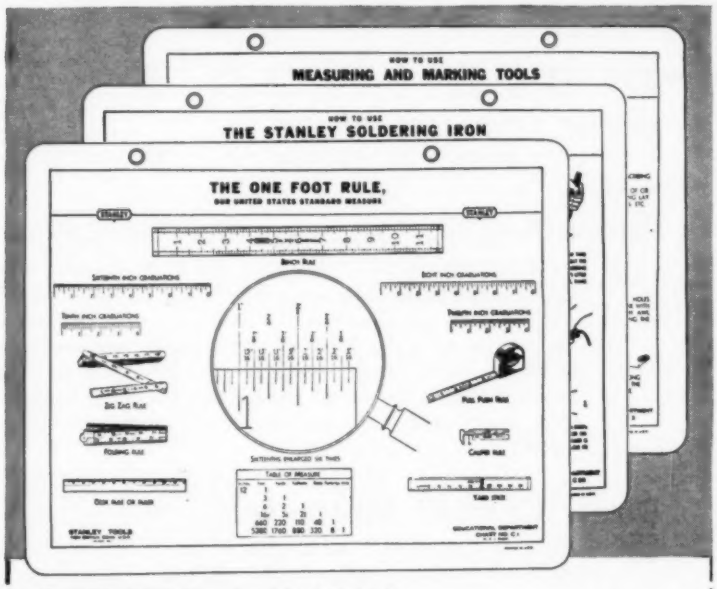

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News Notes

♦ The Stout Institute, Menomonie, Wis., had enrollees from 31 states, the territories of Alaska and Hawaii, the District of Columbia, and the Dominion of Canada, at its 1950 summer session. A total of 576 attended. Of the group, 228 were graduate students and 274 were veterans, two women falling in the latter category.

The 1950 session, 45th in the history of Stout, featured instruction by most of the members of the regular college faculty, plus the following conference leaders, consultants, and teachers:

C. L. Grieber, state director of vocational and adult education in Wisconsin; members of his staff including R. L. Welsh, supervisor of trade and industry; H. C. Thayer, supervisor of teacher training; the late Dora V. Rude, supervisor of homemaking-city division; Mrs. Dorothy Barnett, teacher trainer in homemaking; John Kubiak, supervisor of occupational information and guidance; Martin Wesolowski, teacher trainer for trade and industry.

Visiting faculty from Wisconsin Schools of vocational and adult education were:

T. H. Rees, Racine director; Arthur Larsen and Herbert Bast, Sheboygan; Herbert W. Riegor, Milwaukee; Mrs. Alta Bethke, Appleton; and Mrs. Lucille Towner, Green Bay.

Special conference leaders included:

H. W. Teichroew, trade and industrial education co-ordinator for St. Paul, Minnesota, vocational school; Theodore Pierson, co-ordinator for the Salem, Ore., public schools; Alan R. Pawelek, assistant professor of industrial arts, Ball State teachers college; Dr. Claude H. Ewing, director of the Chicago vocational school; and Richard A. Ibison, teacher of audio-visual education.

♦ Bennett College, Bradley University, had over 100 graduates during the 1950 summer session. These students came from 22 states and Canada. Nineteen persons passed their master's comprehensives and 17 passed qualifying examinations and were admitted to candidacy for the doctor of education degree in industrial education. The new program has attracted a total of 47 post master students, applications for admission to advanced study and admissions to candidacy for the doctoral degree. There were 30 participants in the two-week industrial-arts workshop for Illinois teachers. Attendance at weekly dinner meetings and bull sessions varied from 50 to over 60 persons. Enrollments in the classes of Dr. Bawden, Professor Ericson, Supervisor Ruley, and Dr. Rasche averaged 60 students.

♦ Judges for the National School Safety honor roll have announced that 173 schools throughout the nation conducted safety programs during 1949–50 that merited listing on the honor roll. Each of these schools received a certificate of merit indicating the number of years of continuous listing.

For information regarding the school administrative service of the council, and how to get on the honor roll, write to National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.

♦ Machine-shop teachers will be interested in the four-page description of an annealing process called "cycle annealing." This material was published recently by Surface Combustion Corporation, Toledo 1, Ohio.

♦ International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill., has just published a catalog of educational 16mm. sound films interesting to students of agricultural and industrial subjects.

There is no rental charge for the use of the films, and the only expense incurred will be the transportation charges both ways.

♦ The 1950 revised edition of Grieger's "Encyclopedia and Super-Catalog of the Lapidary and Jewelry Arts" is now ready. It is a 192-page book and may be obtained by writing to *Grieger's, 1633 East Walnut St., Pasadena 4, Calif.* Price, $1.

♦ "Road Maps of Industry" are sent free to teachers of social science who ask for them. They are prepared by the National Industrial Conference Board, 247 Park Ave., New York 17. N. Y.

These road maps of industry show the significant weekly developments throughout the field of economics and are based upon statistics obtained from governmental and other sources.

♦ The *Kodak Color Handbook*, a new publication created to provide a handy reference work and guide for advanced amateur and professional photographers, has just been announced by the Eastman Kodak Company, Rochester 4, N. Y.

It contains 248 pages and over 100 full-color illustrations.

The basic information presented by this new color handbook will assist photographers to do a professional quality job in color photography.

Copies of the *Kodak Color Handbook* are priced at $4 each. The handbook will be available through Kodak dealers.

♦ A black and white sound motion picture telling the story of the manufacture, quality, and contribution of Delco products to the home, industry, and transportation has been produced for the Delco Products Division of General Motors by the Jam Handy Organization, 2821 East Grand Blvd., Detroit, Mich.

For information regarding the film, write Fred Hobbs, Public Relations Department, Delco Products Division of General Motors Corporation, Dayton, Ohio.

♦ A new reprint, "The Aircomatic R Welding Process," has been announced by Air Reduction Sales Company, a division of Air Reduction Company, Incorporated.

This 26-page article, which originally appeared in *The Welding Journal*, was written by A. Muller, G. J. Gibson, and E. H. Roper and discusses the fundamentals of metal-arc transfer in inert-gas-shielded arc welding, also the overcoming porosity in aluminum welding by automatic and manual welding as well as stainless steel, heat-resisting alloys, clad materials and aluminum bronze. The article is illustrated with 68 photographs and charts.

Copies of this reprint (ADR 66) may be obtained without charge by communicating with your nearest Airco sales office or writing *Air Reduction, 60 East 42nd Street, New York 17, N. Y.*

♦ A new 24-page teaching-aids catalog has been published by the school service department of the Westinghouse Electric Corporation. The catalog describes 80 free and inexpensive charts, posters, booklets, and other audio-visual materials now available to junior and senior high school teachers.

Each catalog contains order blanks for use in requesting the materials desired.

Teachers can obtain copies of the teaching-aids catalog (B-4743) by writing to the *School Service Department, Westinghouse Electric Corporation, 306 Fourth Avenue, Box 1017, Pittsburgh 30, Pa.*

♦ Experienced high school teachers from over 30 different states have formulated the rules of a new award program which this winter will give high school students studying vocational agriculture an unusual opportunity for national recognition and a chance to win a sizable award in cash. The program is a $7,000 Arc Welding Award Program conducted by The James F. Lincoln Arc Welding Foundation of Cleveland, Ohio, especially for high school students in vocational agriculture.

Illustrated booklet describing the program and suggesting typical projects can be obtained from the Foundation, Cleveland 1, Ohio.

♦ On August 15, eight boys who showed unusual skill in the design and construction of model cars, were awarded grand national awards of university scholarships in the annual competition of the Fisher Body Craftsman's Guild.

Senior Division: first place, $4,000, Bob Cadaret, 1447 Armadale, Los Angeles, Calif.; second place, $3,000, Forbes R. Powell, 27 Cederbrook Rd., Ardmore, Pa.; third place, $2,000, Albert M. Mandel, 18070 Mackay, Detroit, Mich.; fourth place, $1,000, James K. Fishback, 16 Grace St., Harrisonburg, Va.

Junior Division: first place, $4,000, Ronald C. Hill, 6234 Roy St., Los Angeles, Calif.; second place, $3,000, Elbert Valentine, 16183 Muirland Ave., Detroit, Mich.; third place, $2,000, Kenneth J. King, 2214 Gilpin Ave., Wilmington, Del.; fourth place, $1,000, Ben B. Taylor, Maple, N. C.

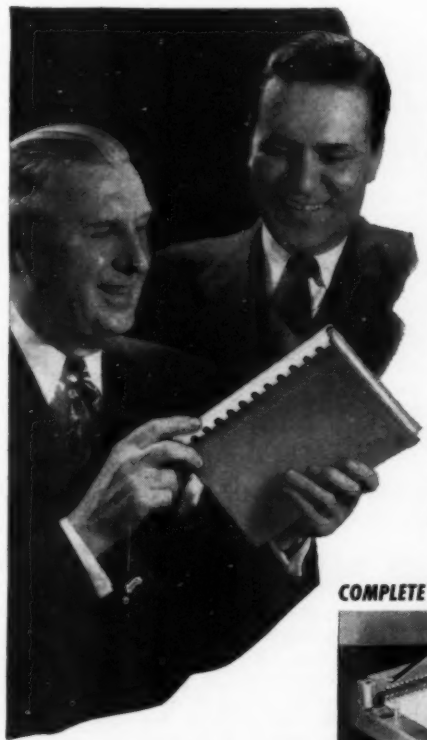
♦ The cycle annealing process, an annealing procedure in which time-temperature program control is used for the annealing of steel forgings and other parts, is described in a new *Surface Combustion* technical bulletin.

This bulletin, which is copiously illustrated, describes the metallurgical background and process equipment for modern cycle annealing. Radiant tube-fired and direct-fired installations are described. The effect of cycle annealing in shortening processing time, providing accurate control of metal structure and improved machinability is presented in detail.

Annealing treatments for typical steels are presented together with their chemical compositions, hardness values obtained, and the time-temperature curves.

The bulletin should be of value to all men concerned with production annealing. Copies are available upon request of *Surface Combustion Corporation, Toledo 1, Ohio.* Write for SC-146.

(Continued on next page)



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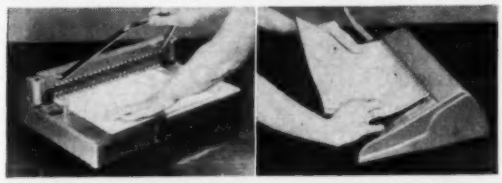

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NEWS NOTES

(Continued from previous page)

♦ Representatives of 75 educational organizations have given their approval to the organization of a permanent National Conference for the Mobilization of Education as a means of tying American education into the new defense program of the nation.

At the close of a two-day session in Washington, September 9–10, the educators voted to set up the conference as a permanent clearing-house for information on defense developments and man-power policies. The conference also will work with the U. S. Office of Education in an advisory capacity.

Conference delegates met with representatives of the U. S. Department of State, National Security Resources Board, Departments of Defense, Army, Navy, and Air force, Selective Service System, Federal Security Agency, Research and Development Board, Department of Labor, and the U. S. Office of Education, to discuss how to deal with special industrial and military training programs which might be set up in the schools during this emergency as in World War II.

♦ Four hundred and sixty-seven junior and senior high school students were notified that they had won cash prizes totaling $13,000 in Ford Motor Company's 1950 industrial-arts awards program, which culminated in the Industrial Arts Fair, which opened on August 7, 1950, in the Chicago Museum of Science and Industry, Chicago, Ill. A total of 2340 students took part in the program. This was more than double that of any previous year.

The Industrial Arts Awards program was open to pupils in industrial arts and vocational classes in all schools from grades seven through twelve. It was stipulated that entries would be regular class projects made in school shops under the supervision of an instructor.

George H. Fern, industrial-arts consultant to the Ford Motor Company, supplied technical assistance to the staff throughout the program.

First prize in each age group within the various classifications was $100; second, $50; and third, $25. Honorable mention awards were $10 each, with six being made in each group.

The judges in the various divisions were:

Wrought Metal Division — Dewey F. Barich, Kent State University, Kent, Ohio; Noel Grinstead, Central Missouri State College, Warrensburg, Mo.; and Fred Strickler, dean, Bennett College, Bradley University, Peoria, Ill.

Patternmaking and Molding — H. A. Sotzin, San Jose State Teachers College, San Jose, Calif.; Thomas Diamond, University of Michigan, Ann Arbor, Mich.; and J. Ely Van Hart, Board of Education, Elizabeth, N. J.

Machine Shop — H. T. Widdowson, University of Minnesota, Minneapolis, Minn.; Deo Duryee, Wilbur Wright Vocational School, Detroit, Mich.; and Lewis Yoho, Ball State Teachers College, Muncie, Ind.

Wood — Frank C. Moore, Board of Education, Cleveland, Ohio; James J. Hammond, State Teachers College, Fitchburg, Mass.; and O. S. Harrison, University of Georgia, Athens, Ga.

Plastics — Chris H. Groneman, A. & M. College of Texas, College Station, Tex.; Delbert Dyke, Middle Tennessee State College, Murfreesboro, Tenn.; and Raymond Cherry, Lockport Township High School, Lockport, Ill.

Electrical — Philip Lewis, *The Educational Screen* (magazine devoted to the use of audio-visual materials), Chicago; A. C. Moutoux, Evansville Public Schools, Evansville, Ind.; and Gordon Wilber, State Teachers College, Oswego, N. Y.

Machine Drawings — S. L. Coover, State Teachers College, California, Pa.; H. C. Spencer, Illinois Institute of Technology, Chicago; and Stanley Pawelek, Baltimore Board of Education, Baltimore, Md.

Architectural Drawings — Albert Heino, Albert Heino & Associates, Architects and Engineers, Chicago; Burl Osburn, State Teachers College, Millersville, Pa.; and J. D. Lonnholm, Allegany County Board of Education, Cumberland, Md.

Printing — DeWitt Hunt, Oklahoma A. & M. College, Stillwater, Okla.; Robert Shields, Cass Technical High School, Detroit, Mich.; and Milo T. Oakland, Northern Illinois State Teachers College, DeKalb, Ill.

Winning entries are being displayed in the Museum of Science and Industry from August 7 until October 14, after which they will be returned to entrants.

♦ The School and College Administrative Service enables all school personnel constantly to keep up with the developments in safety education. It includes latest information on new publications, films, and other teaching aids.

Full membership privileges, such as consultation with staff experts; use of Council's library facilities; participation in annual meetings and special School and College studies; privilege of purchasing National Safety Council material at member price; an opportunity to apply for National Safety Council Honor Roll Certificates are some of the things which constitute the Administrative Service.

Materials included are *Safety Education* magazine, Safety Beacon newsletter, Safety Scope newsletter, Safety Sentinel newsletter, Student Safety Organization newsletter, School Shop Safety newsletter, Accident Facts, Congress Transactions — School Sessions, National Directory of Safety Films, Safety Education Memos 2 and 2A, and an introductory supply of Student Accident Report forms.

For particulars, write to Wayne P. Hughes, director, School and College Division, National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill.

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Yes, more and more busy buyers of Industrial Art Supplies are saving time and money by buying all their machines, equipment and supplies from The Brodhead-Garrett catalog, because:

1. They deal with only one supply source;
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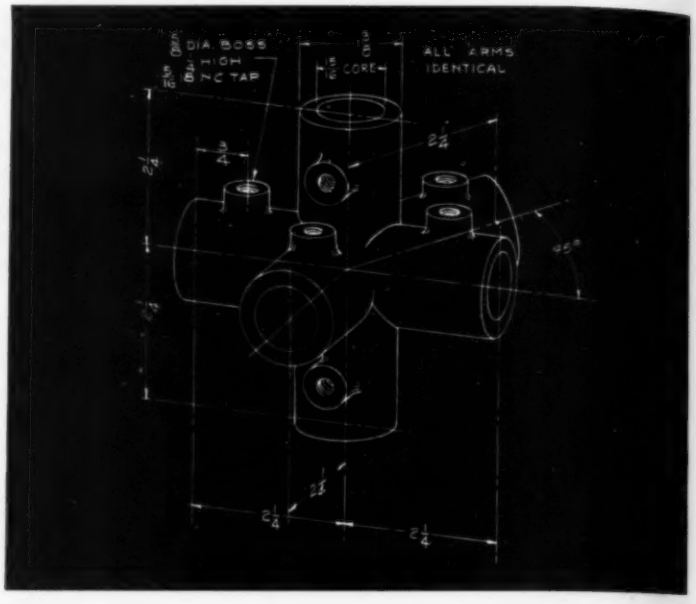
Dixon's latest EldoradoStat offering should be most instructive as a supplement to your regular classroom work. Send for this Problem and Solution without cost to you — blueprint it as many times as you like.

Now in its twelfth year of EldoradoStat service — Dixon is happy in the knowledge that this series has proved so worthwhile to instructors and students alike. Firsthand reports plus an ever-increasing mailing list have testified to this fact.

Also, Dixon is proud of the fact that famous Typhonite Eldorado (2H & 3H) was found the ideal pencil for executing these practical mechanical drawing projects.



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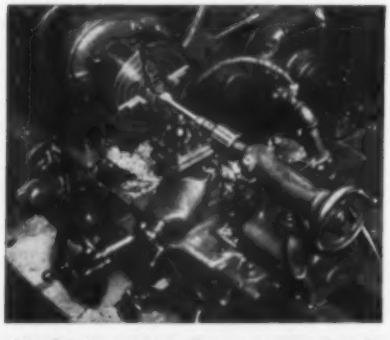
SCHOOL BUREAU, PENCIL SALES DEPT., 128-J11, JOSEPH DIXON CRUCIBLE CO., JERSEY CITY 3, N. J.

Shop Equipment News

NEW PRODUCTS — PUBLICATIONS

PRECISION TURNING ON AIRCRAFT CARBURETOR PARTS

A 9-in. swing South Bend precision bench lathe was tooled up for economically producing aircraft carburetor parts. Longitudinal feed stops were used to locate both ends of the cut. A cross-feed stop was used to position the cutting tool for the diameter. Two high speed steel combination forming and turning tools mounted in a square turret tool block performed all forming, rough turning, and finish turning operations. The workpiece is driven by a 4-jaw independent chuck and supported in the tailstock by a special revolving center. A simple adapter in the 4-jaw chuck permits inserting and removing the work by opening only one chuck jaw, so no re-centering is required.



Machining aircraft parts on South Bend 9-in. precision bench lathe

The specified surface smoothness of 100 microinches rms. was easily surpassed. An average finish of 30 microinches rms. is now being maintained on a production basis, taking one roughing and one finishing cut over the center section of the piece.

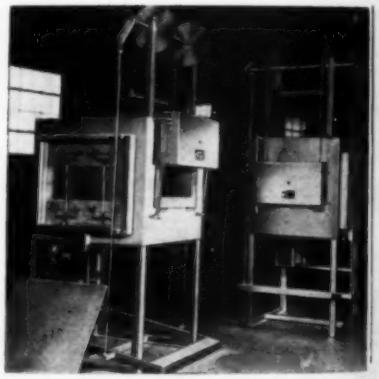
For brief reference use IAVE—1101.

NEW PERECO ELECTRIC ASSAY FURNACE

The new Pereco Electric Assay Furnace is equipped with a centrifugal type electric exhaust blower that serves the dual purpose of drawing air into the heating chamber and carrying off fumes that arise from fusing and cupeling operations. The equipment reaches a fusing temperature of 2000° F. in approximately 2 hours, operating at maximum of 25 kilowatts. Normal temperatures require only 12 to 15 kilowatts.

The heating chamber has a capacity of 35 20-gram crucibles or 24 30-gram crucibles per heat. Size of the chamber is 17 in. wide, 25 in. long, and 7¾ in. high. Operating current for the Glober-type heating elements is 220 volt, 60 cycle, 1-phase.

A thick casing of high and low temperature insulating materials surrounds the heating chamber. The entire unit is jacketed in welded steel. The counterweighted door is foot-operated and, when open, permits full access to the working area. When closed, the door makes an overlapping, tight, wedge fit against all sides of the furnace opening.



New Pereco electric assay furnace

For full information, address the *Pereny Equipment Co., 893 Chambers Road, Columbus 13, Ohio.*

For brief reference use IAVE—1102.

PORTER-CABLE IMPROVED GUILD SAWS AND NEW SPEEDMATIC BELT SANDER

The Porter-Cable Machine Company, Syracuse, N. Y., has just placed two new, improved guild saws, Models A-6 and A-8 on the market. Both saws have built-in calibrated angle-adjustment which permits accurate bevel cutting.

Both saws are equipped with a helical gear

(Continued on page 36A)

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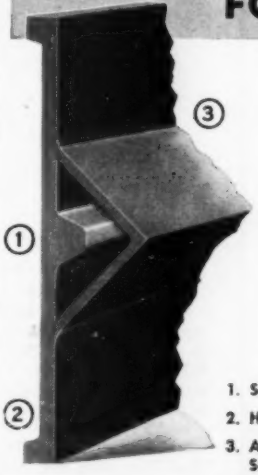

When you specify Sterling Flasks, you get the very best that money can buy. For Sterlings are backed by almost a half century of "know-how" in fabricating precision-built foundry flasks. Sterling pioneered and perfected the famous ROLLED STEEL CHANNEL construction, long proven superior under rough foundry usage. That's why, today, you will find Sterlings in more than 4500 foundries. Write for Catalog No. 60 describing the complete line of Sterling Foundry Equipment.

STERLING WHEELBARROW COMPANY
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1. Solid Rolled Reinforcing Rib
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by

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There was a day when schools only purchased a few "reference copies" of a new book. That was back when:

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2. **Trainees' reading ability was low.**
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Today, the ability to make full use of books is an important element in a trainee's success — both in school and, later, on the job. The long list of schools that have adopted AUTOMOTIVE FUNDAMENTALS provides ample evidence that schools have learned the value of placing a book in the hands of each trainee.

If you have not examined this excellent book and its reasonably priced STUDY GUIDE, we will be glad to send you a copy on approval.

Please rush me a copy of Automotive Fundamentals and the Study Guide on examination.

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CHICAGO 37, ILLINOIS

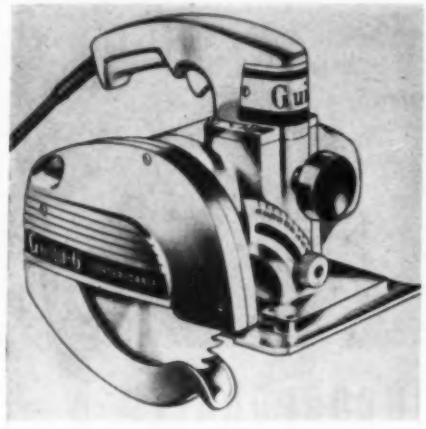
SHOP EQUIPMENT NEWS

(Continued from page 34A)

drive which delivers maximum power for sawing. The Model A-6 cuts full 2 in. at 90 deg., and the Model A-8 cuts 2⅞ in. at 90 deg.

A turbine fan ventilation system draws air through the motor and discharges it at the front, keeping the motor cool and the cutting line clear at all times.

Standard equipment for both saws include one combination saw blade, 10-ft. cord, wrench, tube of grease, and manual.



Improved guild saw

This firm also has announced a new heavy-duty, dustless 4-in. belt sander, Model 500. It is balanced throughout, has a low center of gravity, and the wide belt makes the sander easy to handle.

The 4 by 27-in. belt puts a 25 sq. in. abrasive surface on the work at all times, making it very efficient for stock removal and finishing on desks, table tops, panel doors, wide shelving, etc.

New speedmatic sander

A high powered turbine fan vacuum system assures dust-free operation and longer belt life by preventing excessive clogging of the grits. Belts may be changed in a matter of seconds and the belt tracking control allows quick and easy centering of the belts on the pulleys.

Further information on these machines will be supplied upon request by the *Porter-Cable Machine Co., Syracuse 8, N. Y.*

For brief reference use IAVE—1103.

NO. 579 TELESCOPING GAUGES AND NO. 830 SHORT TYPE SMALL HOLE GAUGES

This new gauge is a refinement of the No. 229 Telescoping Gauge with the important new feature of an automatic, self-centering handle which re-

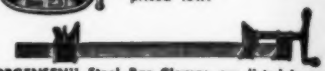
SPECIFY AND INSIST UPON GENUINE "C" CLAMPS

TRADE MARK Jorgensen REG U S PAT OFF

Style #120 "JORGENSEN" "C" Clamps offer the greatest possible value. Correctly designed and liberally proportioned, their low cost, as compared to their great strength, is usually a real surprise!

Where price is the prime consideration, Style #1 "JORGENSEN" Carriage Clamps will be found to be the choice of careful buyers. Very low in cost — yet they are "full size" in all proportions, and will give long, satisfactory service.

"PONY" "C" Clamps are small tools of endless uses, built to real industrial standards. A variety of sizes is available, all priced low.



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"C" Clamps, Handscrews, Steel Bar Clamps, Clamp Fixtures, Press Screws, Lathe Dogs, etc., are available through your favorite tool supplier — cost no more than ordinary clamps!

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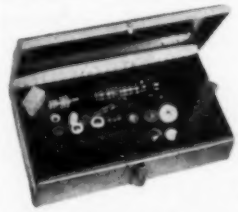

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CHICAGO WHEEL & MFG. CO.

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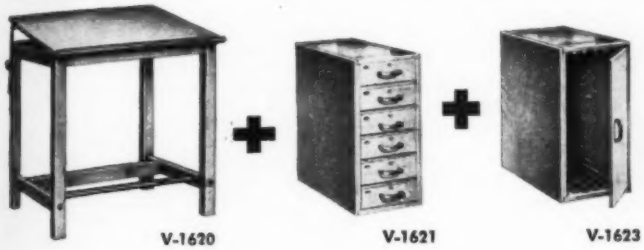
Too many drafting students and not enough room?

Hamilton has the answer!

HERE'S HOW IT WORKS—This simple, sturdy, good-looking Student Drafting Table Assembly is composed of three units, giving it real space-saving flexibility. The Assembly consists of the table (V-1620), the tool drawer unit (V-1621) and the board storage unit (V-1623). Storage units can be arranged to make maximum use of floor space.

FOR EXAMPLE—An entire aisle can be eliminated by placing two rows of tables together. The left-hand row would have the tool drawer unit at right-front and the board storage unit at left-rear, opening to the left-hand aisle (as illustrated). Storage unit arrangement in the right-hand row would be reversed.

This Student Drafting Table Assembly is solidly built of Northern Wisconsin Birch, finished in Golden Brown. Find out for yourself about Hamilton's traditional quality and efficient work-design. You'll be amazed at how little it costs . . . see your Hamilton Dealer now . . . or write us for full details.



V-1620 V-1621 V-1623

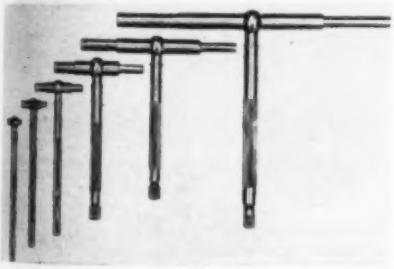
Hamilton

MANUFACTURING COMPANY
Two Rivers, Wisconsin

© 1950, Hamilton Manufacturing Company

mains centered and balanced regardless of the setting of the telescoping plungers.

The handle on No. 579 gauges is rigidly attached to the contact plunger body, and is automatically self-centering at all times. Both contact plungers telescope within each other, providing a rigid, positive seat for the contact plungers in all positions.

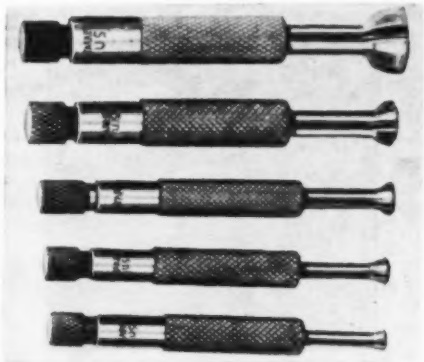


Starrett telescoping gauges No. 579

Constant spring tension gives uniform contact pressure and both plungers are easily locked at any desired setting by a slight turn of the knurled screw in the end of the handle. Ends of the plungers are rounded to give true diameter measurements and are hardened and ground.

These gauges are available in six sizes, either in complete sets or singly, to measure from 5/16 to 6 in.

The No. 830 Short Type Small Hole Gauge was designed for measuring holes, slots, grooves, and recesses ranging from .125 to .500 in., which are too small or shallow for the conventional telescoping gauge. These new gauges have the added convenience of extra short length. The gauging surface is formed with a flat bottom, permitting use in the shallowest holes, slots, and recesses. These gauges are adjustable to size by means of a knurled knob at the end of the gauge which provides a smooth and sensitive adjustment and feel. When used with a micrometer, the size of any hole or slot may be obtained in thousandths or ten-thousandths on an inch. The gauges are available in five sizes covering a range of .125 to .500 in., and may be purchased singly or in sets.



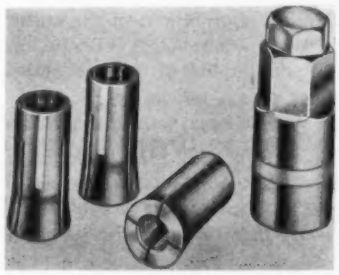
No. 830 small hole gauges

For further information about these gauges write to *The L. S. Starrett Co., Athol, Mass.*

For brief reference use IAVE—1104.

STUD PULLER

The Snap-on Tools Corporation announces the addition of two series of threaded collet type stud removers and inserters. The smaller size unit has 14 different collets available to handle studs from ¼ to ⅝ in., in both fine and coarse thread sizes. The larger model has 6 collets available for ¾ to 1-in. diameter studs in fine and coarse thread sizes.



Stud pullers

To use the stud puller, insert the proper size collet into the housing, and thread the whole unit over the stud. Turning the bolt on top draws the slotted tapered collet up into the housing compressing it and locking it onto the stud threads with a slip-proof grip. A socket, Boxocket, or open end wrench may then be used to pull the stud. Since the pull is directly from the threads only, the studs are not damaged in any way, and they may be re-used again.

All units are precisely machined of high grade steel and carefully hardened and tempered. For further information write to *Snap-on Tools Corp., Kenosha, Wis.*

For brief reference use IAVE—1105.

NEW AUTOMOTIVE TRAINING CHART

Training new personnel in automotive principles and parts nomenclature has been greatly simplified by publication of an educational automotive wall chart by the National Standard Parts Association.

The new chart is another project in the association's continuing educational program, and took over a year of research and study for its development.

(Continued on next page)

Off press this fall!

SOURCEBOOK ON ATOMIC ENERGY

Glasstone. This book was prepared under the direction of the Technical Information Service, Atomic Energy Commission. It is the comprehensive story of the historical development, present status, and possible future of atomic energy, published under exclusive contract with the AEC. Written in understandable language and absorbingly interesting. $2.90. Ready December 4.

FORAGE AND PASTURE CROPS

Wheeler. Here in one book are *all* important facts about all crops sown for forage and pasture in the U. S. Detailed information on the culture, special characteristics, climate, and soil adaptations of grasses and legumes grown for forage. $6.00.

SPEAK WITH EASE

Ross. This is a manual for success in using the spoken word. It tells how to talk to small groups, conferences, or large conventions. Practical help in expressing ideas effectively in panel discussions, from the platform, before a microphone or television camera. (In preparation)

Don't Forget

A C Windings by *Liwschitz-Garik.* Published this month.

Machine Shop: Theory and Practice, by *Wagener and Arthur.* New editions of both textbook and workbook.

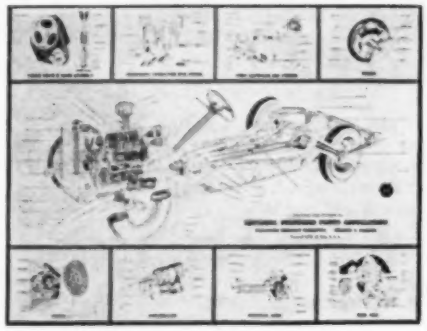
The Craft of Ceramics — *DeVegh & Mandi.* Furniture Making & Cabinet Work — *Pelton.* Two of last year's best sellers.

Van Nostrand

250 FOURTH AVENUE, NEW YORK 3

SHOP EQUIPMENT NEWS

(Continued from previous page)



Automotive training chart

Printed in four colors, the chart is 38 by 50 in. It presents cutaway drawings of the complete automobile chassis, the transmission, clutch, universal joint, rear axle, etc.

The association is making these educational charts available, not only to its members but to automotive trade schools and vocational training institutions.

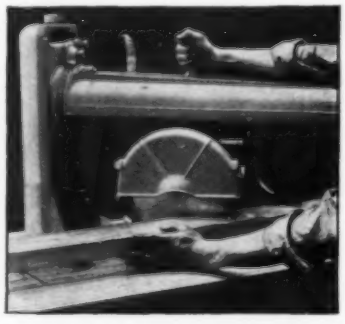
Requests should be directed to *National Standard Parts Assn., 8 South Michigan Ave., Chicago 3, Ill.*

For brief reference use IAVE—1106.

NEW WALLACE NO. 1 RADIAL SAW

The J. D. Wallace & Company announce their production of 5 h.p. radial saw motors weighing just two pounds more than their regular 2 h.p. motors.

The new motor designs result in high-torque drive units, with more than double the power of previous machines. They are used on the new



No. 1 Wallace radial saw

models of the Wallace No. 1 radial saw, which also make use of four new-type linear ball bearings, sliding on hardened and ground steel rods, for the easy and frictionless pull and push of lightweight motors and frictionless slides make for ease of operation never before possible.

These machines are completely "radial" in their adjustment. The motor unit travels 19½ in. in the radial arm, in a straight line. The arm column and motor can all be rotated 360 deg., and locked in any convenient position.

For complete information write *J. D. Wallace & Co., 140 S. California Ave., Chicago 12, Ill.*

For brief reference use IAVE—1107.

THE "BIG SHOT" SPOT WELDER

A-C Devices & Products have developed a welder which they are marketing under the name "Big Shot Spot Welder." The 110-volt unit welds two thicknesses of 20-gauge or lighter metal. The 220-volt unit welds two thicknesses of 14-gauge metal.

Need tools for chopping? Or pulling nails, pounding or cutting? Here's one tool that does all these jobs—and more.

Feel its perfect balance in the light and easy swing. The shock-absorbing hickory handle fits snugly in your grip.

The special analysis steel head is expertly made from the long-lasting cutting edge to the tough striking head.

Get a Plumb hatchet and have a time-saving, all-purpose tool handy.

The red handle and the black head —exclusively Plumb

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HAMMERS • HATCHETS • AXES • FILES

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AND TEMPLETMAKERS

The "Linerite" saves time and insures accuracy in drawing curved or straight PARALLEL LINES, spaced any 1/64 dimension to ¼. Quick, accurate, easy to use. Simply insert pencil or scriber in any of the specially designed holes and slide against curve or straight edge.

Celluloid (specify white or transparent) $1.00

Steel, for metal layout work.... 1.50

Postpaid in U.S.A. Satisfaction Guaranteed.

M. NATH, 4831 Woodhall Ave., Detroit 24, Michigan

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DRUM SANDER

No Glued-Up Sleeves to Buy

Operates in Either Direction

ECONOMICAL—Simply cut sleeves from standard size sheets. UNIQUE way of holding sleeve to drum. No wedge. Smooth running. Twist of key and sleeve is tight. SPONGE RUBBER backing insures long wear of sleeve. Use on drill press, small motor or electric drill taking ½" bit. Adaptor and key included. For HOMESHOP, CABINET SHOP, SCHOOL or INDUSTRY.

2½" x 3" long $2.50
2½" x 3" long 3.00 POST
3" x 3" long 3.50 PAID
4" x 3" long 4.00*

*This drum takes 14" sleeves.

Complete Set 4 drums—Special $12. Orders for 2 drums deduct 50c. Send check, currency or money order.

MONEY BACK GUARANTEE

SINGLEY SPECIALTY CO.
1649 Druid Hills Hendersonville, N.C.

Twelve-inch reach tongs used by left-handed welder

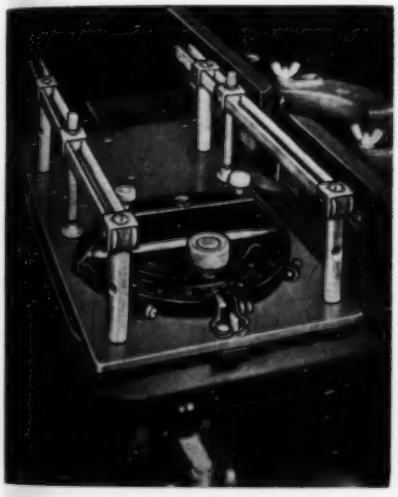
Standard units are equipped with 3½-in. reach tongs. The welder may also be obtained with 12-in. reach tongs.

For more detailed information, write to *A-C Devices & Products, 8666 S. Vincennes, Chicago 20, Ill.*

For brief reference use IAVE—1108.

NEW DELTA SHAPER JIG

The Delta sliding shaper jig is one of more than 1300 power-tool accessories supplied by the Delta Power Tool Division, Rockwell Manufacturing Company. This sliding jig makes it possible to feed short, narrow stock safely to the cutters without slipping. Hands never come close to the knives.



Delta sliding shaper jig

The shaper jig is designed for use on various kinds of work: returning a molding on narrow stock, making joints, beveling square stock, end-working narrow pieces, etc.

For full information write to the *Delta Power Tool Division, Rockwell Manufacturing Co., Milwaukee 1, Wis.*

This firm also has recently published its first issue of a new, school-shop publication, "The Power Tool Instructor," which, as its name indicates, is specially aimed at helping shop instructors.

It will be published four times a year and is mailed to readers free of charge. Persons interested in receiving "The Power Tool Instructor" should send their name, title, school name, and school address to the *Delta Power Tool Division, Rockwell Manufacturing Co., Milwaukee 1, Wis.*

For brief reference use IAVE—1109.

MORE ART METAL DESIGNS

A new book of designs for use on metal has just been published by Metal Goods Corporation. Its title is "More Art Metal Designs," and it contains a wide variety of designs for beginners as well as for advanced craftsmen to etch, paint, or tool.

The designs are bound in book form with each page perforated and punched for loose-leaf binding so that they may be removed for transfer onto metal and then kept in a binder if desired.

This firm also offers complete stocks of circles, rectangular sheets, bracelet blanks, and preformed rectangular trays in aluminum, brass, copper, pewter, and stainless steel.

Free illustrated price list and instructional literature may be obtained by writing *Metal Goods Corp., 640 Rosedale Ave., St. Louis 12, Mo.*

For brief reference use IAVE—1110.

NEW SHELDON CATALOG

The new Sheldon catalog illustrates and describes the Sheldon Verno 12-in. backgeared shaper, the No. 0 horizontal milling machine, and the 10⅛-, 11¼-, and 13⅜-in. swing precision lathes.

Numerous accessories for these power machines also are described.

For a copy of this catalog write to the *Sheldon Machine Co., Inc., Chicago 41, Ill.*

For brief reference use IAVE—1111.

CATALOG OF ENGINEERING AND DRAFTING EQUIPMENT

Catalog *A* of Berger Scientific Supplies, presents a well-illustrated description of the drawing sets, instruments, drafting boards, French curves, pantographs, protractors, scales, slide rules, and triangles.

For a copy of this catalog write to *Berger Scientific Supplies, Inc., 342 Madison Ave., New York 17, N. Y.*

For brief reference use IAVE—1112.

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New Publications

Basic Engineering Drawing

By William Wirt Turner, Carson P. Buck, and Hugh P. Ackert. Cloth, 669 pp., 6⅜ by 9¼ in., illus., $4.50. The Ronald Press Co., New York City.

A book in which are combined engineering drawing, descriptive geometry, and machine drawing.

The book assumes that the student starts out with no previous knowledge of the subject and then proceeds to lead him through freehand sketching, orthographic projection, intersections and developments, pictorial drawing, and working drawings into a thorough understanding of the application of drawing to various types of engineering work.

The book also contains a glossary of shop terms.

Arc Welding Lessons

By Harold L. Kuster. Cloth, 343 pp., 6 by 8⅞ in., illus., $1 in U. S. A.; $1.50 elsewhere. The James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio.

This is a welding text for schools, and it is a great help for anyone who wants to gain skill in doing repair and construction work on the farm.

The book is divided into three parts, the first of which is devoted to information on selecting and caring for the equipment, the selection of electrodes, the operation of the torch, identification of metals, the controlling of distortion, and how to do welding safely.

Part two outlines and shows how to do 17 different welding, cutting, and shaping operations.

Part three consists of 28 pages of welded projects.

Illustrating for Tomorrow's Production

By J. Harold Farmer, Abbott J. Hoecker, and Francis F. Vavrin. Cloth, 203 pp., 6¼ by 9½ in., illus., $5. The Macmillan Co., New York City.

A book on illustrating which describes the methods that are used to an increasing extent in modern production practices.

Parts 1 and 2 explain how to make isometric and oblique drawings, true-scale perspectives, and exploded views.

Then these various methods of making pictorial drawings are illustrated in making rough and comprehensive layouts. The subject of rendering is then explained; also the various reproduction methods such as printing with zinc and half-tone cuts, the offset process, photostats, etc.

Parts 3 and 4 show how illustrating finds application in the fields of aircraft production and advertising.

The illustrations used as examples in the book are excellent.

Lettering: History and Technique

By Alexander Nesbitt. Cloth, 300 pp., $6. Prentice-Hall, Inc., New York 11, N. Y.

This work takes up in Section One the history of letters, beginning with the early pictographs, the contributions of the Greeks and Romans, and the early work of the Germanic tribes. Much space is devoted logically to the development of Gothic, uncial, and the lettering of the later Middle Ages, down to the fifteenth century when printing was invented.

The final chapter of the history of lettering provides a well-balanced account of the work of the classic type designers of Germany, Holland, Italy, and finally of Scotland and England.

The more recent contributions of the calligraphers and type designers of the late nineteenth century and the first half of the twentieth century are described in detail. While the author

(Continued on page 42A)

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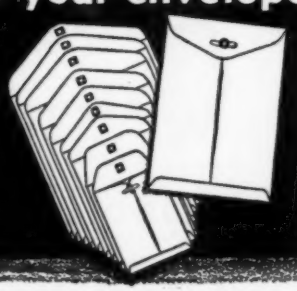

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NEW PUBLICATIONS

(Continued from page 40A)

evaluates this work it may be questioned whether its value lies in mere refinement of the older classic work rather than in truly original designing. We are still too close to this work to fully recognize the permanent worth of the new alphabets. What seems most attractive may pass away as did the prolific work of the designers of the Victorian decades.

The second section of the book is a practice course in lettering, which is intended to provide a basic understanding of the anatomy of the script and Roman letters. Necessarily, much attention is given to lettering in poster design and advertisements. The course anticipates the help of a competent teacher in a carefully considered series of basic lessons and projects.

Learning to Drive Safely

By A. R. Lauer. Spiral binding, paper cover, 145 pp., 8⅜ by 10⅞ in., illus., $2.25. Burgess Publishing Co., 426 South Sixth St., Minneapolis 15, Minn.

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The course of instruction comprises the following ten units: getting acquainted with the car; learning to start and stop smoothly; learning the finer points in starting and stopping—mastery of the clutch; learning to back and turn safely; developing confidence in driving and mastery of turns; learning to park easily and safely; learning to get your car in and out of close places; preparing for traffic and road driving; discussion of the principles of traffic driving and their importance in safe motoring; and driving in traffic.

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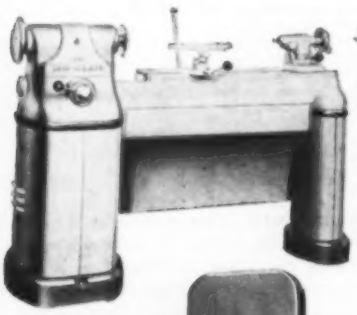

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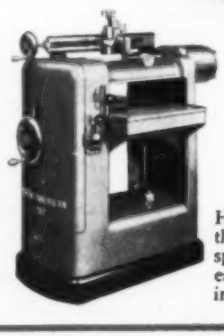
For wood turning, metal spinning or both; 55 in. bed, 31 in. between centers; 12 in. swing, 14½ in over gap. Variable speed drive provides 700 to 3200 rpm. Lubricated-for-life bearings.

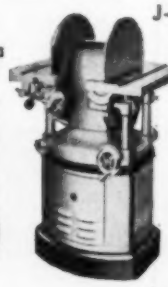


J-140 MORTISER
Cuts straight, smooth and square mortises up to ½ in. in hard or soft wood. Foot-operated ram. Compound table permits successive straight line cuts without reclamping. Easily converted to single borer.

J-180 SURFACER
Handles stock up to 18 in. wide, 6 in. thick. Vee-belt variable feed gives feed speeds from 18 to 55 fpm., makes it easy to get high-quality finish. Cast-iron base and frame.

J-120 BAND SAW
Handles stock up to 19½ in. wide; opening under guide, 13½ in. Blade completely enclosed except for point of cut. Table tilts 45 degrees right, 12 degrees left, has hinged section to permit easy blade removal.

J-145 SPINDLE SANDER
Detachable spindle oscillates 90 times a minute with ½ in. stroke. Table, 20x24 in., tilts 45 degrees left, 10 degrees right. Down draft discharges dust at rear. Storage space in base.



J-147 DISC SANDER
Can be used on wood, metal, plastics, ceramics, composition. Single or double disc, dynamically balanced for smooth, quiet operation.

J-150 SHAPER
Alloy steel spindle 1⅛ in. in diameter has 3 in. vertical adjustment, easily made by handwheel. Table, 30x38 in. has cored chip disposal spouts.

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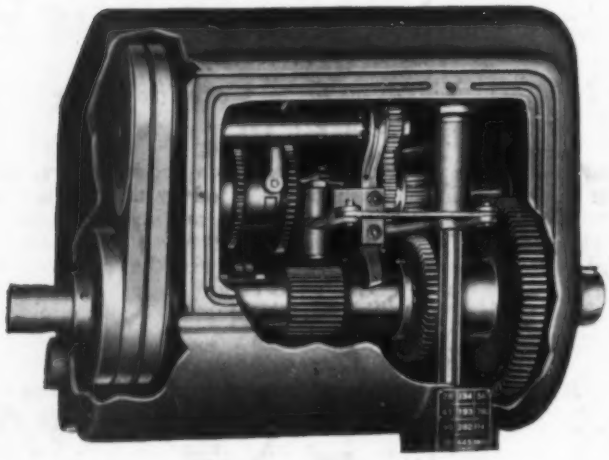

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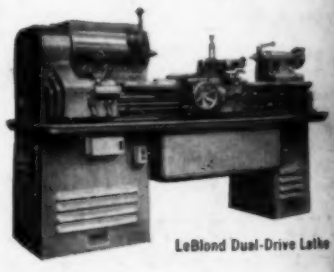

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